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ABSTRACT

This teacher handbook provides recommended goals and objectives and suggested measures for competency-based courses in the vocational program area of trade and industrial education. A background and overview section contains the philosophy and rationale, discusses thinking skills and programs for exceptional children, and provides notes that explain how to read the goals, objectives, and measures and offer suggestions for student placement, textbook use, and activities. This specific information is then provided for a vocational education competency-based curriculum: purpose and overview (target groups, philosophy, curriculum planning and design) and course of study. For trade and industrial education, grades 9-12, are offered a program description, learning outcomes, and scope and sequence. These courses are included in the curriculum: aerospace, auto body repair, auto mechanics, cabinetmaking, carpentry, cosmetology, diesel mechanics, electrical trades, electronics, furniture, graphics and industrial communications, industrial cooperative training, machine shop, marine occupations, masonry, plumbing, sheet metal, small gasoline engines, tailoring, technical drafting, textiles, upholstery, and welding. Materials provided for each course include a topical outline and a one-page format for each competency goal that details grade level, skills/subject area, the competency goal, objective(s), and measure(s) (suggestions of ways in which students may demonstrate their ability to meet the objective). (YLB)

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TEACHER HANDBOOK
TRADE & INDUSTRIAL EDUCATION
VOCATIONAL EDUCATION

North Carolina
Competency-Based
Curriculum
SUBJECT-BY-SUBJECT

NORTH CAROLINA DEPARTMENT OF PUBLIC INSTRUCTION

CE044258

TEACHER HANDBOOK

VOCATIONAL EDUCATION

TRADE AND INDUSTRIAL EDUCATION

GRADES 9-12

North Carolina Competency-Based Curriculum

Division of Vocational Education
Instructional Services
North Carolina Department of Public Instruction

Raleigh, North Carolina
1985

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Foreword

As a result of the Elementary and Secondary School Reform Act of 1984 and the appropriation which accompanied this act, the North Carolina State Department of Public Instruction engaged in an extensive audit and revision of curriculum throughout the summer and fall of 1984. The products of this work, the North Carolina Standard Course of Study and the Teacher Handbook for the competency-based curriculum, provide a detailed, integrated basic course of study for all subjects at all grade levels.

The North Carolina General Assembly has also made a commitment to the development of a basic education program. This program includes the staffing and material support needed for the full implementation of the North Carolina Standard Course of Study and the competency-based curriculum in all public schools throughout the State. The financial support of the General Assembly and the work of educators throughout the State in developing the competency-based curriculum are important contributions to our continuing efforts to provide a quality education for every child residing in North Carolina.

A. Craig Phillips
State Superintendent of Public Instruction

Acknowledgements

The Instructional Services Area of the Department of Public Instruction acknowledges with gratitude the outstanding cooperation and assistance we have received from individuals and groups throughout the State of North Carolina. Without such cooperation, the development and printing of the North Carolina Standard Course of Study and the Teacher Handbook for the competency-based curriculum would not have been possible.

We wish to express a special thanks to:

- the North Carolina General Assembly for providing the funds to make this important work possible,
- more than 8000 local educators who participated in the writing of the documents and in reacting to early drafts,
- almost 300 persons from institutions of higher education who advised the staff and assisted in the development of the curriculum,
- Raleigh-based and regional staff in the Divisions of Arts Education, Communication Skills, Computer Services, Exceptional Children, Healthful Living, School Media Programs, Mathematics, Science, Social Studies, Student Services, and Vocational Education. These Public Instruction staff members carried the primary responsibility for planning, writing, and editing the curriculum.
- the Controller's Office in the Department of Education for excellent assistance in designing a computer program for storing and printing the Standard Course of Study and the competency-based curriculum,
- the Division of School-Community Relations for technical assistance in the publication of the documents,
- all areas of the Department of Public Instruction for their encouragement and invaluable assistance in numerous ways,
- Kay Barbour and Janice Royster who word-processed the entire 8000 pages, and
- especially Dr. Barbara Holland Chapman who coordinated the development of the Standard Course of Study and the competency-based curriculum. Her untiring efforts have contributed significantly to the quality of these documents.

The involvement of the entire education community in the writing of the curriculum truly makes it a North Carolina curriculum of which the State can be justifiably proud. We look forward in the coming years to working with all of you in revising and improving the competency-based curriculum in order that it will continue to meet the needs of the children of North Carolina.

Joseph B. Webb

Joseph B. Webb
Assistant State Superintendent
Instructional Services

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BACKGROUND AND OVERVIEW

Introduction

Immediately following the passage of the Elementary and Secondary Reform Act in June of 1984, the area of Instructional Services within the North Carolina State Department of Public Instruction began a revision of the North Carolina Standard Course of Study and the development of the Teacher Handbook for the competency-based curriculum. These efforts represent a significant part of the development of a basic education program for North Carolina's Public Schools.

Three publications hold the results of our efforts to define a basic education program for the State: The Basic Education Program for North Carolina's Public Schools, North Carolina Standard Course of Study, and the Teacher Handbook for the competency-based curriculum. The Basic Education Program for North Carolina's Public Schools outlines the curriculum, programs not confined to subject areas, general standards, material support, and staffing which should be provided in all schools throughout the State. The North Carolina Standard Course of Study, adopted by the State Board of Education, provides an overview of the basic curriculum which should be made available to every child in the public schools of our State. It includes the subject or skills areas of arts education, communication skills, guidance, healthful living, library/media skills, mathematics, science, second language studies, social studies, and vocational education as well as the philosophy and rationale underlying the curriculum and considerations which should be made in developing thinking skills and providing for the needs of exceptional children. The Teacher Handbook for the competency-based curriculum provides recommended goals and objectives and suggested measures for each subject or skills area.

The first step taken in auditing and refining the curriculum in each subject or skills area was to review and synthesize the reports of curriculum review committees and the work contained in two earlier publications (Course of Study for Elementary and Secondary Schools K-12 and Competency Goals and Performance Indicators). The next step was to involve educators from local education agencies and institutions of higher education in working with the North Carolina Department of Public Instruction staff to expand and refine the curriculum. Thousands of persons throughout the State have been involved in the development of the North Carolina Standard Course of Study and the Teacher Handbook for the competency-based curriculum.

Three important points should be kept in mind when reviewing these documents. First, while the curriculum represents the standard course of study which should be available to all children in North Carolina Public schools, many public schools in the State presently offer an even more comprehensive curriculum. Second, the standard course of study includes the curriculum that should be made available to every child, not what every child is actually required to take. Required subjects or courses are outlined in the appendices.

Third, the North Carolina Standard Course of Study and the Teacher Handbook for the competency-based curriculum will never actually be completed. Several steps have been taken to insure that the curriculum may be constantly updated: the documents have been entered on an IBM 5520 computer word-processing program for ease of revision and updating; the competency-based curriculum has been produced in loose-leaf form so that revised or additional pages may easily be added; and included in each document is the name of a contact person within the State Department of Public Instruction to whom staff in local education agencies or others may send suggestions for additions or revisions (Appendix I). As with any viable curriculum, these documents must be constantly open to review, expansion, and revision in order that they continue to meet the needs of the children of the State of North Carolina.

Philosophy and Rationale

The philosophy and rationale underlying the North Carolina Standard Course of Study and the Teacher Handbook for the competency-based curriculum imply a context in which the curriculum will be implemented. What follows are definitions of the purposes for which the curriculum was developed and the principles incorporated into its development as well as descriptions of who will implement it and where it will be successfully implemented.

Purposes and Principles

The primary purposes of the North Carolina Standard Course of Study and the competency-based curriculum are (1) to help students become responsible, productive citizens and (2) to help students achieve a sense of personal fulfillment. It is clear that there are competencies which a student must develop in order to meet both of these purposes.

Students must develop the specific competencies needed to gain employment or continue their education. These competencies include critical thinking skills, skills with media and technology, and the basic content knowledge provided within a core curriculum (arts education, communication skills, healthful living, mathematics, science, second language studies, social studies, and vocational education).

Students must develop the skills and attitudes necessary to cope with contemporary society. Among these are a positive attitude toward oneself, a sense of independence and responsibility for oneself, an understanding of oneself and one's own culture, a positive attitude toward others including those who come from different cultures, a respect for the rights of others, a sensitivity to the needs and feelings of others, a sense of responsibility to others, a willingness to cooperate with others in working toward a common goal, and the ability to understand and cope with a constantly changing society.

In order to help students become responsible, productive citizens who have a sense of personal fulfillment, commonly accepted principles of learning have been incorporated into the North Carolina Standard Course of Study and the Teacher Handbook for the competency-based curriculum. One of these principles is the importance of integrating the curriculum--of emphasizing the understanding of concepts and processes over the mere acquisition of isolated facts. Stressing the mastery of integrated knowledge helps students to move from what is known to an understanding of the unknown, to see relationships and patterns and begin to make generalizations, to understand the interrelatedness of the subject areas and skills areas, and to succeed in learning. An integrated curriculum helps students learn how to learn.

Another principle considered in the development of the North Carolina Standard Course of Study and the Teacher Handbook for the competency-based curriculum is that learners are more likely to attempt those tasks at which they feel they can succeed and which are relevant to their lives. If students are to be successful in school and if they are to pursue lifelong learning, they must see learning as worthwhile. The competency-based curriculum is, therefore, a program of continuous learning based upon the individual student's needs, interests, and stages of development. The curriculum provides opportunities for the student to develop self-expression, to learn to communicate effectively, to maintain and develop both physical and emotional health, to choose among curriculum electives, and to become an active participant in the learning process. The importance of personalizing the curriculum to help each student reach her/his maximum potential is stressed.

Effective Teachers

It is the classroom teacher at each grade level or in each subject area who has the most direct influence on the implementation of the North Carolina Standard Course of Study and the competency-based curriculum. The ultimate task of integrating the curriculum must be performed by the classroom teacher through preparation for instruction and presentation of content. Student success in learning is assured when teachers use the information gained through monitoring and evaluation to determine appropriate instructional tasks and to provide appropriate feedback to students. What the teacher presents and how the teacher presents it determines whether students feel the task is relevant to their lives. The teacher's efficient management of instructional time and student behavior are also important to the successful implementation of the curriculum in each classroom.

Effective Schools

Several common characteristics will be present in the schools which most effectively implement the North Carolina Standard Course of Study and the competency-based curriculum. These characteristics include strong instructional and administrative leadership by the principal of the school, dedicated and qualified teachers, an emphasis on curriculum and instruction, a positive school climate, ongoing evaluation based on student achievement, and good home/school relations. Strong instructional and administrative leadership by the principal means that the principal functions as the instructional leader, supports instructional effectiveness by the way in which the school is managed, and clearly communicates the school's mission to staff, students, and parents. Dedicated and qualified teachers care about their students, understand and support school-wide goals and procedures, work as a team, exhibit positive morale and enthusiasm for their work, and demonstrate their good training through application of the skills involved in quality teaching. An emphasis on curriculum and instruction includes clearly stated school-wide goals and objectives, structured staff development based on the school's goals, curriculum continuity (alignment among school-wide goals, instructional approaches, materials used, and the assessment of students' needs, abilities, and interests), and a high percentage of student time-on-task. Elements of a positive school climate are a safe and orderly environment, a perceptible feeling of pride and school spirit in all that the school does, the communication of high academic and social expectations to students, and opportunities for student responsibility and involvement. Ongoing evaluation based on student achievement begins with early identification of students' needs, abilities, and interests, includes frequent monitoring of student progress in multiple ways (teacher observation, classroom activities, homework, teacher-made tests, mastery skills checklists, criterion-referenced tests), and results in appropriate instructional prescriptions to improve individual student performance and the school-wide instructional program. Good home/school relations are the outgrowth of effective, positive communication between the school and the home. This includes encouraging parents to help their children at home, making them feel they are appreciated by the school staff, and letting them know they are welcome in the school and have a part to play in school affairs. Good home/school relations increase parents' support of the school's instructional goals and disciplinary policies.

The characteristics described above will be found in the elementary, middle/junior high, and high schools which most effectively implement the North Carolina Standard Course of Study and the competency-based curriculum. However, in each of these schools consideration must be given to the unique development needs--intellectual, physical, social, and emotional--of the students served. For example, the need of young children for concrete, hands-on experiences; the need of middle school children for transitional experiences in curriculum choices, scheduling, and conseling; and the need of high school students for the variety of curriculum choices provided by the comprehensive high school.

The North Carolina Standard Course of Study and the competency-based curriculum represent a comprehensive, integrated course of study; however no document by itself has ever made the ultimate difference in the quality of education which children receive. Principals who function as instructional leaders and teachers who make use of their most effective teaching skills will appropriately implement the competency-based curriculum and thus insure that the children of North Carolina receive a quality education.

Thinking Skills

In order to become productive, responsible citizens and to achieve a sense of personal fulfillment, students must develop the ability to think. Thinking skills should be developed and reinforced throughout the curriculum and during every activity of the school day. It is also important that students be helped to apply these skills to "real life" situations outside the school.

The most frequently used system for classifying thinking skills is Bloom's (1956) Taxonomy. This system, with adaptations made by Sanders (1966) and Soar et al. (1969), was used in the integration of thinking skills throughout the Teacher Handbook for the competency-based curriculum. These skills fall into seven broad categories--memory, translation, interpretation, application, analysis, synthesis, and evaluation.

The most basic thinking skills are memory and translation. Memory involves the ability to remember specific pieces of information or facts such as names, dates, events, and rules. Translation requires the student to remember specifics and to understand or express them in her/his own terms. One example of a translation skill is the student's ability to restate a classroom rule in her/his own words. Another example is the ability to read the mathematical symbol "+" as "plus".

Remembering isolated bits of information or even restating that information in one's own words does not necessarily require reasoning on the part of the student. Higher-level thinking skills are defined as those processes which require thinking or reasoning above the levels of memory or translation--interpretation, application, analysis, synthesis, and evaluation.

Students begin to demonstrate their ability to reason through interpreting information, applying what is learned in one situation to a new situation, and analyzing information. Ways in which a student might demonstrate the ability to interpret information are to list the similarities and differences between two or more objects or to tell why a particular classroom rule was established. A student demonstrates a degree of ability in the category of application when s/he is able to explain how the principle of representative government at the state and federal levels may apply to the election of officers to the student council. A student who reads a newspaper editorial and is able to distinguish fact from opinion, point out unstated assumptions, and recognize bias is demonstrating skills of analysis.

When students apply skills of analysis, they are taking apart a whole. When students apply synthesis skills, they are creating a whole that is unique or new to them. Synthesis is usually equated with creativity. Composing a song, building a model house, or formulating a hypothesis during a science experiment are examples of synthesis activities.

Evaluation is distinct from opinion in that evaluation is the conscious making of judgments based on evidence or criteria. Opinion is usually formed from an emotional or affective base. Students serving as jurors during a simulated trial are using evaluation skills or making judgments based on evidence. Students critiquing one another's writing based on established elements of style are using evaluation skills or making judgments based on criteria.

To insure that students develop higher-level thinking skills they should be guided in the use of these skills in each subject area at each grade level and in their application to "real life" situations. When developing lesson plans, teachers should prepare tasks and questions at a variety of cognitive levels. However, strict adherence to previously prepared questions may inhibit rather than enhance a class discussion. Furthermore, it is often difficult to think of appropriately worded higher-level questions in the midst of a good classroom discussion. The following simple strategies will lead to the asking of higher-level questions and the giving of higher-level responses:

1. Before starting an activity, explain to the learner what you are going to do.
2. Before starting an activity, give the learner time to familiarize her/himself with the materials.
3. Ask questions which require multiple word answers.
   (e.g., "Why did he choose that path?")
4. Ask questions which have more than one correct answer.
   (e.g., "What things make people happy?")
5. Encourage the learner to enlarge upon her/his answer.
   (e.g., "Tell us more about that.")
6. Get the learner to make judgments on the basis of evidence rather than by guessing.
   (e.g., "You said . . . Read the line in the book that made you think that.")
7. Give the learner time to think about the problem; don't be too quick to help.
   (e.g., Wait at least five seconds before prompting or asking another question.)
8. Get the learner to ask questions.
   (e.g., "If the astronaut were in our classroom, what questions would you ask her?")
9. Praise the learner when s/he does well or takes small steps in the right direction.
10. Let the learner know when her/his answer or work is wrong, but do so in a positive or neutral manner. (Desirable Teaching Behavior Task Force, 1976)

The following are examples of two levels of activities (K-1 and above K-1) within the seven categories of thinking skills and two categories of questions or statements (affectivity and procedure) outside the seven categories of thinking skills:

Florida Taxonomy of Cognitive Behavior--K-1 Form (Soar et al., 1969)

1. Memory--items at this level are intended to represent no activity other than rote memory. The pupil is expected to give back an idea in the same form it was given, without changing the nature of the idea or the form in which it was expressed.

   a. repeats from memory
   b. repeats other
   c. repeats in sequence
   d. choral response
   e. spells
   f. gives/receives information
   g. seeks information

2. Translation--the intent of this category is to identify pupil activities involved in changing the form in which an idea is expressed, but not in changing or manipulating the idea itself.

   a. sounds letters
   b. names pictures, objects, colors, letters
   c. copies letter, number, work (learned)
   d. gives/follows directions
   e. describes situation, event
   f. reports experience (2+ thoughts)
   g. describes situation, event
   h. recognizes word (sight words)
   i. translates one language into another or vice versa (e.g., math symbols into words or Spanish into English)
   j. asks/gives permission
   k. puts into own words

3. Interpretation--the activities in this category are those of making comparisons, identifying similarities or differences, identifying relatedness, or carrying out a process in which the child has previously been instructed, when told that the process is appropriate.

   a. sounds out word
   b. classifies (1 attribute)
   c. counts
   d. adds/subtracts
   e. uses units, tens
   f. compares letters, numbers
   g. copies letters(s), number(s)--learning
   h. gives class name (vehicle, etc.)
   i. identifies similarities, differences
   j. asks/gives reason (opinion)
   k. names sensation
   l. performs learned task or process
   m. relates terms (e.g., 1/first, little/small, purple/violet/lavender)
   n. makes comparisons
   o. describes what may be seen to be happening in a picture

4. Application--one of the central aspects of application is that the student is able to select from past learning that which is appropriate for the current situation, and apply it. In interpretation a process was carried out when specified, but here the pupil must decide her/himself what process should be applied. Organization and the interrelationships between two or more ideas are central.

   a. classification (2+ attributes)
   b. directs learning game
   c. creates arithmetic problem
   d. writes/types sentence
   e. asks/tells who, what, or where
   f. seriates (alphabetizes)
   g. applies previous learning to new situation
   h. reads (thought unit)
   i. selects and carries out process

5. Analysis--the central elements in this category are those of inferring causation, motivation, or feelings from information given about the setting and the behavior of the people involved, or of identifying information which supports a conclusion, or establishing the accuracy of a process. The selection and use of relevant supporting data is the central process.

   a. verifies equation balance
   b. infers feeling or motive
   c. infers causality (tells why)
   d. cites evidence for conclusions

6. Synthesis--the central idea of the synthesis category is that the child organize ideas in a way that is new to her/him, or projects probable consequences of a given behavior, or formulates a plan or set of rules to deal with anticipated difficulties, or produces something which is new to her/him.

   a. elaborates on picture or story
   b. proposes plan or rule
   c. play-acts
   d. makes up story
   e. makes fantasied object (e.g., sand or clay)
   f. makes common object (e.g., sand or clay)
   g. draws/colors common object
   h. draws/colors fantasied object
   i. makes predictions based on available facts

7. Evaluation--the central concept of evaluation is that there must exist a set of standards or criteria against which behavior or some sort of product is compared.

   a. compares with criteria or rule
   b. compares with plan

Florida Taxonomy of Cognitive Behavior (Brown et al., 1968)

1. Knowledge (memory)

   1.1 Knowledge of Specifics--requires the memorization of information or knowledge which can be isolated or remembered separately, the smallest meaningful bits.

   a. reads
   b. spells
   c. identifies something by name
   d. defines meaning of term
   e. gives a specific fact
   f. tells about an event

   1.2 Knowledge of Ways & Means of Dealing with Specifics--requires knowledge about the manner in which specific information is handled--the ways of organizing, working, and evaluating ideas and phenomena which form the connecting links between specifics. It does not require the learner to deal actually with the specifics her/himself, but rather to know of their existence and possible use. Thus, s/he may be expected to state a previously encountered principle or generalization, but not to develop one. The items which belong to this category refer to processes rather than products of processes; they usually represent higher abstractions than the items of the preceding category.

   a. recognizes symbol
   b. cites rule
   c. gives chronological sequence
   d. gives steps of process, describes method
   e. cites trend
   f. names classification system or standard
   g. names what fits given system or standard

   1.3 Knowledge of Universals & Abstractions--deals with the highest of abstractions at the memory level. In order to evidence this behavior the individual must know major generalizations, their interrelations, and patterns into which information can be organized and structured. These items reflect the major concepts which comprise the framework of a discipline or major area of knowledge. The four items in this category are descriptions of behavior which would identify or verbalize a major concept.

   a. states generalized concept or idea
   b. states a principle, law, or theory
   c. tells about organization or structure
   d. recalls name of principle, law, or theory

2. Translation--is dependent upon possession of relevant knowledge. The task is to convert communication into known terms; it requires the understanding of the literal message in the communication. Communication is used here in its broadest sense; it could be a demonstration, a field trip, a musical work, a verbal message, or be demonstrated in pictorial or symbolic form.

a. restates in own words or briefer terms
b. gives concrete example of an abstract idea
c. verbalizes from a graphic representation
d. translates verbalization into graphic form
e. translates figurative statement to literal statement or vice versa
f. translates foreign language into English or vice versa

3. Interpretation--individual not only identifies and comprehends ideas, as in translation, but also understands their relationships. It goes beyond repetition and rephrasing the parts of a communication to determine the larger and more general ideas contained in it. Thus, comprehension may require reordering into a new configuration in the mind of a person, involving the determination of the relative importance of ideas and the interrelationships. However, the thinking is dependent upon what is given to the student--s/he is not expected to bring abstractions from other experiences into the situation.

   a. gives reason (tells why)
   b. shows similarities or differences
   c. summarizes or concludes from observation of evidence
   d. shows cause and effect relationship
   e. gives analogy, simile, metaphor
   f. performs a directed task or process

4. Application--individual must know an abstraction well enough to be able to demonstrate its use in a new situation. The task is to bring to bear upon given material or situation the appropriate information, generalizations or principles that are required to solve a problem. Application, as distinguished from comprehension, involves transfer of training. It is based on an individual's being able to apply previous learning to a new or novel situation without having to be shown how to use it. The problem itself is given.

   a. applies previous learning to a new situation
   b. applies principle to new situation
   c. applies abstract knowledge in a practical situation
   d. identifies, selects, and carries out process

5. Analysis--describes cognitive behavior in which there is an emphasis on the breakdown of material into its parts in order to detect the relationships of the parts and the way they are organized. The first four items at this level describe skills used in the identification or classification of the elements of the communication.

   a. distinguishes fact from opinion
   b. distinguishes fact from hypothesis
   c. distinguishes conclusions from statements which support it
   d. points out unstated assumption
   e. shows interaction or relation of elements
   f. points out particulars to justify conclusion
   g. checks hypothesis with given information

h. distinguishes relevant from irrelevant information
i. detects error in thinking
j. infers purpose, point of view, thoughts, feelings
k. recognizes bias or propaganda

6. Synthesis (creativity)--represents cognitive activities in which the individual puts together elements and parts in order to form a whole in such a way as to constitute a pattern or structure that was not stated before. This entails recombining parts of earlier experiences in a new organization that is unique to the synthesizer. In analysis, the person takes apart a given whole; in synthesis s/he creates a whole.

   a. reorganizes ideas, materials, processes
   b. produces unique communication or divergent idea
   c. produces a plan, proposed set of operations
   d. designs an apparatus
   e. designs a structure
   f. devises scheme for classifying information
   g. formulates hypothesis, intelligent guess
   h. makes deductions from abstract symbols, propositions
   i. draws inductive generalization from specifics

7. Evaluation--describes activities of conscious judgment making; involves use of criteria or standards to determine the worth or value of methods, materials, or ideas. Evaluations must be distinguished from opinions which are usually made from an emotional or affective base.

   a. evaluates something from evidence
   b. evaluates something from criteria

Noncognitive Categories of Questions/Statements or Tasks (Davis & Tinsley, 1967)

Affectivity--questions/statements or tasks which elicit feeling, emotion, or opinion without a standard of appraisal, e.g., "How does the story make you feel?" or "Wasn't that a good story!"

Procedure--questions/statements or tasks related to organization, behavior, or management, e.g., "Are you listening to me?" or "Please get ready for class to begin."

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Programs for Exceptional Children

Exceptional children are (1) learners who because of permanent or temporary mental, physical, or emotional handicaps need special education and are unable to have all their educational needs met in a regular class without special education or related services, or (2) learners who demonstrate or have the potential to demonstrate outstanding intellectual aptitude and specific academic ability and, in order to develop these abilities, may require differentiated educational services beyond those ordinarily provided by the regular school program. Classifications of exceptional children include those who are autistic, academically gifted, hearing impaired (deaf or hard of hearing), mentally handicapped (educable, trainable, or severely/profoundly), multi-handicapped, orthopedically impaired, other health impaired, pregnant, behaviorally/emotionally handicapped, specific learning disabled, speech/language impaired, and visually impaired (blind or partially-sighted).

The primary purpose of exceptional children programs is to insure that handicapped and gifted learners develop mentally, physically, and emotionally to the maximum extent possible through the provision of an appropriate, individualized education in the proper setting.

Curricula for most exceptional learners follow the curricula designed for learners in general education. However, modification of instructional programs, creative instructional approaches, individualized programming, and appropriate selection and use of curricula are necessary to meet the special needs of exceptional learners. In curricula, emphasis must be given to instruction in arts education, communication skills, healthful living, mathematics, library/media skills, science, social studies, and vocational education. Attention must be focused upon cognitive, affective, psychomotor, and vocational development within the curricular areas. The Individualized Education Program for the handicapped and the Group Education Program for the academically gifted, both of which are based upon a comprehensive assessment, are to state in writing the special curricular offerings to be provided to each exceptional learner.

The Individual Education Program for the handicapped requires objective criteria, evaluation procedures, and schedules for determining, on at least an annual basis, whether or not short-term instructional objectives have been achieved. The Group Education Program for the academically gifted requires annual goals and evaluation methods. All special education instruction provided to handicapped and academically gifted learners is to be individualized and designed to meet unique learning needs.

Learning outcomes--knowledge, skills, concepts, understandings, and attitudes--for the handicapped and the academically gifted will differ from learner to learner. For many exceptional learners, the same learning outcomes developed for learners in general education will be appropriate. Some exceptional learners will meet the learning outcomes at a different time and in a different manner than learners in general education. Some handicapped learners might not meet the learning outcomes in general education and will need a totally different curriculum.

The majority of handicapped and academically gifted learners spend a portion of their instructional day within general education, integrated into classes with non-handicapped and nonacademically gifted learners. General education teachers, as well as exceptional education teachers, must be familiar with curricula and capable of selecting appropriate curricular goals and objectives based upon the unique educational needs of each learner as determined by comprehensive assessment, and as stated in the Individualized Education Program for exceptional learners, emphasis needs to be placed on instructional techniques rather than differentiated or modified curricula.

While the general education curricula are appropriate for most exceptional learners, there are times when the teacher must vary the curricular content: some children are not ready for certain types of curricular content at the usual age; some disabilities prevent or make difficult participation in certain learning experiences; different levels of ability may limit or encourage participation in certain school subjects; and some learners spend less time in school. Curricular choice is determined by need.

Curricular goals must be oriented toward skills and application instead of general knowledge. The goals must include skills related to maintaining health, communicating ideas, achieving personal and social growth, handling money concerns, working with measurements, getting along in an expanding community, coping with the physical environment, maintaining a home, using leisure time, and career development.

The competency-based curriculum is to be maximized for exceptional learners. Teachers must be familiar with the curriculum, making judicial use of it in the instructional program for handicapped and academically gifted learners.

Notes to Those Using the TEACHER HANDBOOK

The North Carolina Standard Course of Study, adopted by the State Board of Education, provides an overview of the basic curriculum which should be made available to every child in the public schools of our State. It includes the subject or skills areas of arts education, communication skills, guidance, healthful living, library/media skills, mathematics, science, second language studies, social studies, and vocational education as well as the philosophy and rationale underlying the curriculum and considerations which should be made in developing thinking skills and providing for the needs of exceptional children. The Teacher Handbook for the competency-based curriculum provides recommended goals and objectives and suggested measures for each subject or skills area.

Definitions

Competency Goals: broad statements of general direction or purpose.

Objectives: specific statements of what the student will know or be able to do.

Measures: a variety of suggestions for ways in which the student may demonstrate s/he is able to meet the objective.

How to Read the Goals, Objectives, and Measures

Competency Goals have been written as complete sentences stating why the learner should be able to meet the stated objectives, e.g., "The learner will know causes and events of the settlement of the West."

For purposes of clarity and brevity Objectives have been written as phrases or clauses beginning with a verb, e.g., "Know the importance of railroads in the settlement of the West." These phrases or clauses would logically be preceded by "The learner will (know the importance of railroads in the settlement of the West)."

For purposes of clarity and brevity Measures have also been written as phrases or clauses beginning with a verb, e.g., "Describe the advantages of the railroad over horse-drawn wagon, river transportation, and other commonly used methods of transportation." These phrases or clauses would logically be preceded by "One way (or some ways) a student may demonstrate s/he is able to meet successfully the objective is to (describe the advantages of the railroad over horse-drawn wagon, river transportation, and other commonly used methods of transportation)."

Appendix E is an example of a page from the Teacher Handbook for the competency-based curriculum.

Student Placement

From kindergarten through eighth grade each skill or subject area has been divided into grade levels. This was done in order to make it easier for teachers to gain a general idea of what should be covered at each grade level. In order that instruction fit the individual needs of each student, it is most important that the classroom teacher use the activities in the Measures column to determine the appropriate placement for each child. For example, if a second-grade student is not able to complete successfully the Measures in the reading skills section at the second-grade level, Measures at the first-grade or kindergarten level should be administered. When the base level at which the child can perform successfully has been determined, instruction should begin with and proceed from that level of Competency Goals and Objectives.

The Measures column includes a variety of suggested means for assessing student performance including informal measurements (e.g., manipulatives, oral reports, role playing, projects, and some paper and pencil activities) and formal measurements (e.g., items for teacher-made tests, criterion referenced tests, and/or standardized tests). Some of the items in this column may be administered in whole-group or small-group situations; others should be given only to individual students. These items may be used for the purpose of pretesting to determine appropriate student placement, for monitoring ongoing student progress, and/or for post-testing to determine student learning.

It is apparent that in order for students to be placed appropriately for instruction (particularly in first through eighth grade), each teacher must have at least one, and preferably two or more, grade levels of the competency-based curriculum on each side of the grade s/he is teaching. It must be remembered that the higher the grade level the greater the span of students' needs and, therefore, the greater the need for a teacher to have a wider grade span of the curriculum available. An adequate grade span of the curriculum is also important for teachers of exceptional children at all grade levels.

Responsibility for Implementation

The North Carolina Standard Course of Study specifies which skills and subjects are to be taught at each grade level from kindergarten through grade twelve. The skills to be taught or developed at all grade levels are communication skills, library/media skills, thinking skills, and affective skills. The subjects to be taught from kindergarten through grade six are arts education, healthful living, mathematics, science, second language studies, and social studies. The same subjects, with the addition of vocational education, are to be taught in grades seven through twelve.

The Teacher Handbook for the competency-based curriculum provides recommendations for what should be taught in each skills or subject area from kindergarten through eighth grade and in each course from ninth through twelfth grade. Each teacher's primary responsibility is to teach the subject(s) or courses which s/he is specifically assigned, as well as to help students develop thinking and affective skills. However, each teacher also has a responsibility for appropriately integrating other skills (communication, library/media) and subjects (arts, healthful living, mathematics, science, second language studies, social studies, and vocational education) into the skills or subject areas which are her/his specific assignment.

Teachers in departmentalized schools at the middle/junior high or secondary levels have a responsibility for integrating curriculum in several ways. These include: (1) the integration of curriculum within their subject area in order to help students to make a smooth transition from one level to the next, e.g., from English I to English II, from Algebra I to Algebra II, from French II to French III; (2) the appropriate integration and development of those skills which are every teacher's responsibility (thinking and affective skills); and (3) whenever appropriate, the integration of other skills and subjects into their specifically assigned subject or skills area.

The Teacher Handbook for the competency-based curriculum serves as a resource guide for the integration of all skills and subjects in departmentalized situations. Teachers may look over the curriculum within the specific skills or subject area for which they are responsible in order to determine the overall scope and sequence. They may look at the outlines for thinking and affective skills in order to determine which of those skills have been integrated into their particular segments of the curriculum or to determine how they may integrate additional thinking and affective skills. Looking over other skills and subject areas will help teachers determine what should be appropriately integrated into their own areas. For example, while it is a primary responsibility of the high school English teacher to teach writing and speaking skills, the high school social studies teacher must be familiar with those skills and has a responsibility for reinforcing those skills in the written and oral work done in the social studies classes. Prior to beginning written and oral reports the social studies teacher should review the writing and speaking skills portions of the communications skills curriculum, using these as guidelines for instruction and the development of student assignments. Similar examples could be given with mathematics and science teachers or English and vocational education teachers.

Teachers in self-contained classrooms at the elementary, middle/junior high, or high school levels have the primary responsibility for integrating the curriculum in a variety of ways. These include: (1) integrating the curriculum within each skills or subject area in order to help students make a smooth transition from one grade level to the next; (2) integrating thinking skills and affective skills throughout all areas of the curriculum; (3) the integration of skills and subjects whenever possible though units of study;

(4) integrating skills and subjects introduced by teachers or specialists outside the homeroom into what is being taught within the homeroom; and (5) coordinating the efforts of teachers outside the homeroom (teachers of arts education, physical education, exceptional children, and library/media specialists, or guidance counselors) in order to supplement the homeroom curriculum. The Teacher Handbook for the competency-based curriculum serves as a guide for the integration of skills and subjects in self-contained situations as it does in departmentalized situations.

The principal shares in the responsibility for the successful implementation of the competency-based curriculum. The implementation and integration of the curriculum should be the focal point for decisions made by the principal in the role of instructional and administrative leader. Decisions made with respect to scheduling, disposition of student discipline, uninterrupted time for classroom instruction, and the distribution of materials and supplies may each serve to facilitate or frustrate the successful implementation and integration of the curriculum.

Staff within the area of Instructional Services at the North Carolina Department of Public Instruction also share responsibility for the successful implementation of the competency-based curriculum. Staff from the Regional Education Centers and Raleigh are, of course, available to assist Local Education Agencies in the implementation of the curriculum.

Use of Textbooks

The North Carolina Standard Course of Study is the curriculum approved for the public schools of North Carolina. Textbooks supplement this curriculum. With reference to their appropriateness for use with the North Carolina Standard Course of Study, textbooks are reviewed and recommended by the Textbook Commission. The State Board of Education then adopts a list of textbooks from which school districts make individual selections. Appendix G is a description of this process. If textbooks are at variance with the curriculum, the North Carolina Standard Course of Study takes precedence.

Computer Access

The North Carolina Standard Course of Study and the Teacher Handbook for the competency-based curriculum (with the exception of mathematics grades 7-12) have been entered on the IBM 5520 computer at the State Department of Public Instruction. Each skills or subject area at each grade level has been entered as a separate document. This allows Local Education Agencies, Institutions of Higher Education, and others with access to the mainframe in Raleigh to call up and print out any portion of the curriculum, e.g., any skills or subject area across all grade levels, all skills and subjects for one particular grade level, one subject at one grade level, or the entire competency-based curriculum. Those with access to the mainframe will, therefore, have immediate access to any revisions or additions to the curriculum.

Activities and Resources

The development or cataloging of activities and resources to assist in the implementation of the competency-based curriculum is an ongoing activity of Instructional Services staff working with teachers and others in each of the Local Education Agencies. Concentrating this effort in the local school districts provides teachers the opportunity to become familiar with the curriculum. As activities and resources are developed for each skills or subject area, they will be made available for State-wide dissemination through the IBM mainframe.

Working Space

Working space has been left at the end of goals throughout the Teacher Handbook for the competency-based curriculum. This space has been provided so that teachers may write in additional objectives and measures and/or make notes regarding instruction, activities, and resources.

How to Make Suggestions for Additions or Revisions

As with any viable curriculum, the Teacher Handbook for the competency-based curriculum must be open to constant review, expansion, and revision in order that it continue to meet the needs of the children of this State. Anyone having suggestions for additions to or revisions of this curriculum may complete and submit the form in Appendix I, or may contact:

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Assistant State Superintendent
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Education Building
Raleigh, NC 27611

Trade and Industrial Education

COMPETENCY-BASED CURRICULUM

NORTH CAROLINA DEPARTMENT OF PUBLIC INSTRUCTION

VOCATIONAL EDUCATION

PURPOSE AND OVERVIEW

The overall mission of vocational education in the public schools is to provide a program capable of meeting the individual needs, interests, abilities, and aspirations of each student which is realistic in light of actual or anticipated opportunities for gainful employment, advanced education, and practical life application.

Specific purposes of vocational education are to:

1. Prepare individuals for entry-level employment in recognized occupations, new occupations, and emerging occupations at various levels of competence.

2. Prepare individuals for participation in advanced or highly skilled post-secondary vocational and technical education.

3. Provide individuals with laboratory experiences and activities which assist them in the making of informed and meaningful occupational choices, and/or which serve as the foundation for skilled vocational-technical education.

4. Provide individuals with laboratory experiences and activities which assist them in: (a) making informed consumer decisions; and (b) the application of practical life skills.

Competency-based courses are offered in eight vocational program areas:

1. Prevocational Education
2. Agricultural Education
3. Business and Office Education
4. Marketing Education
5. Health Occupations Education
6. Home Economics Education
7. Industrial Arts Education
8. Trade and Industrial Education

Vocational education provides appropriate programs and/or supportive services for persons who have academic, socioeconomic, and/or other disadvantages or handicaps that prevent them from succeeding in regular programs. It serves both in-school and out-of-school youths as well as adults.* Guidance, placement, and follow-up are also integral components of this program.

Target Groups

The major target group to be served by vocational education programs are youths in grades 7-12. In planning a vocational education competency-based curriculum, the following groups are listed in priority order for determining which target populations are to be served:

1. Students desiring immediate employment upon termination of high school. This group may include those who drop out or who graduate from high school, and desire to enter directly into the labor force.

2. Students who will engage in nongainful employment. This group includes students who apply their vocationally-related skills in situations without receiving pay. Examples are homemakers and volunteers.

3. Students who will engage in post-secondary training and education at less than the baccalaureate degree level. This group includes those persons who will pursue one-year, two-year, or other training programs in business schools, apprenticeship programs, technical colleges, and technical institutes, but who will not pursue a four-year college program. It may also include students who go directly into the military from high school.

4. Students who will pursue four-year or longer-term college degrees in fields related to vocational program areas.

5. Students who pursue nonvocationally-related college programs and who wish to develop practical life skills related to vocational educational and/or to develop certain vocationally-related skills transferable to other career settings.

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*NOTE: For purposes of this publication, "youths" is defined as persons between the ages of five and eighteen. "Adults" refers to the those persons over the age of eighteen. This is in support of, and not in conflict with, adult education provided by the community college system.

Philosophy

The State Board of Education has responsibility for providing direction and leadership to vocational education. This leadership is provided through the Master Plan for Vocational Education and other federally required plans.

The Master Plan encompasses all activities and programs, provides the framework for all other plans, and incorporates the vocational education philosophy of the State Board of Education. Implied within the philosophy of the State Board of Education are the following:

1. Vocational courses should be open to students regardless of race, sex, national origin, or handicapping conditions. Appropriate programs should be made available to students who have left high school and wish to pursue a course of study.

2. Teaching transferable skills and knowledge is important in preparing students to become adaptable in a changing work environment.

3. General education and vocational education are interdependent. General education programs should provide an awareness of career opportunities in their fields and how each is applied in the world of work. Vocational instruction should provide opportunities for students to apply communication and computation skills and other general education learnings to special occupational areas.

4. Employment needs and student aspirations should determine which occupational programs to offer with employment needs taking priority.

5. High quality vocational education programs require extensive planning with policies and guidelines from the state and federal government providing direction.

6. Input from local advisory committees, employment data, student surveys, and student follow-up are all necessary in planning, implementing, and evaluating local vocational programs.

7. Each student should be furnished written documentation of specific competencies achieved through participation in a vocational education program.

8. Counselors and all vocational teachers should form linkages with business, industry, and the community to increase the relevance of school for the work place. As a result, students should have the opportunity to participate in cooperative work experiences, internships, shadowing, and apprenticeships.

9. All students in vocational education should have an opportunity to develop and extend their learnings through participation in active vocational student organizations. The program of work for each

organization should be based on instructional competencies and be an integral part of the vocational program.

10. Strong vocational guidance, counseling, job placement, and follow-up services should be available to assist students in planning for their careers and enrolling in appropriate courses.

Planning and Designing the Curriculum

Trends in our society, as well as specific factors in the economy, technology, educational system, and the labor market influence planning an appropriate vocational education program. Vocational education planners need to design programs which will accommodate:

1. The availability of resources.
2. Changes in population characteristics.
3. Labor needs in new and emerging occupations, including small business ownership.
4. Labor needs in existing occupations with greater than average anticipated growth.
5. The rapid rates of increase in employment projected for the service sector of the public and private economy.
6. A projected decrease in occupations requiring a four-year college preparation.
7. The rapid changes in consumer technology.
8. Changes in individual and family lifestyles.

When designing the curriculum for a given school or the total school system, local planning personnel will need to organize a comprehensive and appropriate sequence of vocational offerings for students enrolled in grades 7-12 based on an assessment of the (1) student needs, interests, and aspirations, and (2) labor market demands and projections.

The following figure illustrates the minimal/ideal number of vocational program areas from which offerings may be selected to accommodate the elective program for a balanced, comprehensive secondary school system.

COURSE OF STUDY

MINIMUM PROGRAM	DESIRABLE PROGRAM	HIGHLY DESIRABLE PROGRAM*
Prevocational Program	Prevocational Program	Prevocational Program
PLUS	PLUS	PLUS
Introductory/Skill Development in a Single Sequence in no less than Three Program Areas	Introductory/Skill Development in Multiple Sequences in no less than Five Program Areas	Skill Development in Multiple Sequences in Seven Program Areas
		PLUS
		Specialized Non-sequenced Courses

*In a highly desirable program, students would also be provided the opportunity to participate in independent study or independent study combined with challenge exams for credit in programs which cannot be offered as formal courses in the school system.

Priority is to be given to the vocational skill development component of the program. However, planning must ensure that through the selection and combination of specific course offerings from the eight program areas, all students in grades 7-12 are given a chance to explore the world of work, begin to appraise their own individual talents, interests, aptitudes, and obtain vocational knowledge, skills, and attitudes in preparation for advanced training activities and/or practical life situations.

Within any program area of vocational education, the scope and sequence of course offerings may vary from district to district. In some program areas, it may take three or four courses to have a basic program while other program areas may require only one or two. What is basic in vocational education in any of the eight program areas is dependent upon the unique needs of an individual school district. To determine what is basic to a particular program area contact the district vocational education coordinator and review the Vocational Education: Program of Studies, Revised.

TRADE AND INDUSTRIAL EDUCATION

Program Description

The mission of Trade and Industrial Education is to prepare students for careers in industry and the trade occupations through a sequence of learning experiences designed to enable them to achieve their highest occupational potential. These learning experiences are presented in the introductory courses, skill development courses, and the student organization activities. Vocational Industrial Clubs of America (VICA), the student organization for Trade and Industrial Education, complements each course and therefore, is essential in order for students to achieve their goals within Trade and Industrial Education. When the component parts are brought together as a whole, the teacher and school can offer a truly comprehensive Trade and Industrial Education program.

As a component of Vocational Education, Trade and Industrial Education is concerned with preparing students for initial employment and advancement in a wide range of trade and industrial occupations. It is a balanced program of classroom study and practical work experiences that achieve the goal of producing competent workers. The courses available in Trade and Industrial Education are developmental rather than terminal, thus providing maximum options for male and female students to become employed or to continue their education and training at the postsecondary level.

The purpose of Trade and Industrial Education is to provide education of high quality which is realistic in light of actual or anticipated opportunities for gainful employment and which is suited to students' needs, interests, and abilities. In each course, provisions are made for the student to develop psychomotor skills, attitudes, work habits, knowledge, and the general principles relative to the occupations. These learning experiences are taught in shops and laboratories or through on-the-job training for skilled and semi-skilled occupations concerned with designing, producing, processing, assembling, testing, and maintaining any product or commodity. All occupations of a trade and industrial nature are potential offerings with special emphasis on apprenticeable occupations. These courses provide a means by which students become responsible and productive citizens and enjoy the benefits of an affluent society.

Learning Outcomes

The major objectives in Trade and Industrial Education are to:

1. Provide opportunities for students to develop the basic manipulative skills relative to occupations through a combination of simulated shop and laboratory experiences or on-the-job training experiences.

2. Provide students with technical information (principles and theory) with emphasis on concepts of mathematics, design, economics, and science pertinent to employment and success in an occupation.

3. Provide students with general-related instruction which includes such areas as human relations, safety and health habits, the world of work, and other socioeconomic factors essential to employment and success in an occupation.

4. Provide for students through the National and State Student Organization (VICA-Vocational Industrial Clubs of America) opportunities to develop leadership abilities, civic responsibilities and other qualities essential in the world of work.

Scope and Sequence for Trade and Industrial Education

The total scope and sequence of Trade and Industrial Education includes varied program offerings for students in grades 10 through 12. Students may enter and progress through one of several program sequences in order to achieve their major objectives in the Trade and Industrial Education program. The determination of which sequence(s) of offerings to make available to students in a local education agency should be based upon a documented assessment of the needs and interest of students, the labor and resources in the community/region, program enrollment, and availability of qualified teaching staff and appropriate instructional facilities.

In Trade and Industrial Education, the scope of program offerings includes, but is not limited to, the following courses:

Construction

Masonry
Carpentry
Plumbing
Electrical Trades
*Climate Control

Manufacturing

Cabinetmaking
Furniture
Electronics
Textiles
Machine Shop
Welding

Transportation

Aerospace
Auto Mechanics
Auto Body Repair

Communication

Technical Drafting
Graphics and Industrial Communications

Public and Private Industry Services

Cosmetology
Marine Occupations
Industrial Cooperative Training
*Maintenance

*NOTE: Competency listings and test item banks are currently being developed for these courses.

Primarily based upon job market demand and student interests, each local education agency must decide on the variety and range of program offerings in each school. The following chart represents the scope and sequence of offerings for a given situation in which a comprehensive Trade and Industrial Education program is possible.

SAMPLE SCOPE AND SEQUENCE FOR TRADE AND INDUSTRIAL EDUCATION

Cluster	Grades 10-12	Grades 11-12	*Grade 12
	**Introduction to Trade and Industrial Education OR		
Construction	Masonry I	Masonry II	Masonry III
	Carpentry I	Carpentry II	Carpentry III
	Plumbing I	Plumbing II	Plumbing III
	Electrical Trades I	Electrical Trades II	Electrical Trades III
	Climate Control I	Climate Control II	Climate Control III
Manufacturing	Cabinetmaking I	Cabinetmaking II	Cabinetmaking III
	Furniture I	Furniture II	Furniture III
	Electronics I	Electronics II	Electronics III
	Textiles I	Textiles II	Textiles III
	Machine Shop I	Machine Shop II	Machine Shop III
	Welding I	Welding II	Welding III
Transportation	Aerospace I	Aerospace II	Aerospace III
	Auto Mechanics I	Auto Mechanics II	Auto Mechanics III
	Auto Body Repair I	Auto Body Repair II	Auto Body Repair III
Communication	Technical Drafting I	Technical Drafting II	Technical Drafting III
	Graphics & Industrial Communications I	Graphics & Industrial Communications II	Graphics & Industrial Communications
Public and Private Industry Services		*Industrial Cooperative Training I	*Industrial Cooperative Training II
	Cosmetology I	Cosmetology II	Cosmetology III
	Maintenance I	Maintenance II	Maintenance III
	Marine Occupations I	Marine Occupations II	Marine Occupations III

Courses are shown at first grade level offered, but may be offered at any succeeding grade level.

*Cooperative work experiences, internships, and/or production work activities are strongly encouraged for each student enrolled at this level.

**Blueprint Reading should be incorporated into ITIE sequence.

Introductory Courses

Introduction to Trade and Industrial Education is an introductory offering designed to familiarize students with a number of T&I occupations and special skills required for employment. This course should aid students in making a career decision about Trade and Industrial Education at Level II. The ITIE course uses the cluster approach with study of two or more T&I occupations. The clusters included should reflect the skill development courses available within the school at Level II (and other needs identified in the community). The length of each cluster may vary, dependent upon the needs of the community and the number of clusters included. Where feasible, students participating in this course are to receive an orientation to Industrial Cooperative Training (ICT) by the coordinator lasting at least one or two weeks. Instructors are expected to use 50% of the class time for "hands-on" experiences in the shop or laboratory. The advanced skill development T&I courses (Level II and Level III) must be available to students in order to receive funding approval of ITIE.

Level I--Introductory Course is an introductory course designed to familiarize students with a specific T&I occupational area and the special skills required for employment. This course should aid students in making a career decision about Trade and Industrial Education at the next level. Instructors are expected to spend at least 50% of the class time in the "knowing" element of the trade, with remaining time in the "doing" element of the trade. The advanced level course (Level II and Level III) for this specific Level I course must be available to students in order to have a comprehensive program.

Skill Development Program Offerings

Industrial Cooperative Training (ICT) is a cooperative effort of the school, home, business, and industry to provide students with on-the-job training to meet their vocational needs, interests, and abilities. The training provides supervised occupational experiences enabling student-workers to acquire skills, related technical information, and desirable work habits and attitudes. The ICT course is available to students who are at least 16 years of age and is normally offered at grades 11 and 12. Completion of ICT I is a prerequisite for enrollment in ICT II.

In the cooperative setting, employers provide on-the-job training in actual working conditions under the supervision of a craftsperson. In cooperation with the employer, a training plan must be developed for each student in order that both may achieve their goals. Students work approximately three to five hours a day during school days, receiving wages and school credit for satisfactory in-school and on-the-job training. The school provides a certified teacher/coordinator who correlates the technical related information taught in school with the student/worker's on-the-job training. General related information designed to develop positive attitudes and leadership abilities is an integral part of the instructional program.

Trade Preparatory Training (TPT) provides training in the basic psychomotor skills and knowledge of an occupational area in order to enter employment at an advanced level. Trade Preparatory Training is competency based; therefore, when a student has acquired the stated competencies, s/he has the option of moving into an ICT program for on-the-job training. TPT consists of Level II courses being taught on the 11th grade level for 550 minutes per week and Level III courses at the 12th grade for 550 minutes per week. If a Level III course has a live project or requires extra time for setup or other conditions, it should be 825 minutes per week.

Instructors are expected to use at least 50% of the class time in the "doing" element of occupation, with approximately 30% in the "knowing" element and 20% on other values important in training an advanced student.

Specialized Skill Development Offerings

In addition to the traditional offerings, the more comprehensive programs in Trade and Industrial Education may include one or more course options or specialized offerings based upon the needs of the local community. Several possible local offerings that focus either on a specific trade or specialized service technology are identified below:

Construction

Sheet Metal

Transportation

Diesel Mechanics
Small Gasoline Engines

Manufacturing

Tailoring
Upholstery

Public and Private Industry Services

Business Machine Maintenance
Law Enforcement
Appliance Repair
Air Conditioning/Refrigeration
Programming and Broadcasting

These courses provide a more specialized base of preparation for Trade and Industrial Education students. Outlines are included for some of these courses.

Aerospace Outline

1. Introduction to the Airplane
    a. Assembling components of simple aircraft
    b. Fixed wing aerodynamics

2. Instruments and Systems
    a. Operation of aircraft airframe
    b. Operation of engine systems

3. Aircraft Hand Tools
    a. Hand tool usage
    b. Safety precautions

4. Aviation-Aerospace History
    a. Stages of development
    b. Feats of aviation-aerospace

5. Weight and Balance
    a. Basic knowledge of theory
    b. Basic knowledge of practice

6. Meteorology
    a. Knowledge of theory
    b. Forecast information to flight planning

7. Flight Computer
    a. Basic aviation calculations
    b. Develop flight plans

8. Navigation
    a. Dead reckoning and pilotage navigation
    b. Preparation of navigation log
    c. Wind triangle
    d. Five types of aerial navigation

9. Radio Navigation
    a. VOR navigation system
    b. Automatic direction finder
    c. Current radio aids
    d. Preparation of navigation log

10. Safety

    a. Operating procedures for tools
    b. Operating procedures for equipment

11. Careers

    a. Career and occupational opportunities
    b. Aerospace fields

12. Communications

    a. Microphone usage
    b. Light aircraft equipment
    c. Morse code

13. Federal Aviation Regulations

    a. Define Regulations
    b. Interpret rules

14. Aircraft Materials

    a. Materials for aircraft components
    b. Defects

15. Aircraft Structures

    a. Plans and specifications
    b. Aircraft parts from plans

16. Aircraft Stability

    a. Three control axes
    b. Primary and auxiliary control devices

17. Design

    a. Characteristics
    b. Structure, construction, and fuels

18. Power Plants

    a. Aircraft reciprocating and reaction engines
    b. Operation of reciprocal engine
    c. Function of engine parts

19. Space
    - a. Flight history facts
    - b. Body placement
    - c. Categories of space exploration

20. Flight Physiology
    - a. Effects of high altitude
    - b. Sensory effects
    - c. Drug and alcohol usage

21. Airports and Traffic Control
    - a. Types of airports and runways
    - b. Traffic patterns for landing and takeoff
    - c. Rules of flight

22. Advanced Aerodynamics
    - a. Structural changes and additions
    - b. Problems

23. Airmans Information Manual
    - a. Necessary information
    - b. Desired information

24. Flight Planning
    - a. Procedures
    - b. Use of operational flight plan

25. Social, Cultural, Economic, and Political Impact of Aerospace
    - a. Social and cultural impact
    - b. Economic and political impact

26. Flight Training (optional)
    - a. Preflight checklist
    - b. Flight maneuvers

27. Leadership
    - a. Characteristics of a good leader
    - b. Importance of parliamentary procedure
    - c. Correct use of 17 parliamentary procedures
    - d. VICA participation

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 1: The learner will assemble components of simple aircraft in correct order using diagrams, models, pictures, or actual aircraft parts.

Objectives	Measures
1.1 List correctly the five major components of the aircraft and the individual members of each component.	Refer to competency Test Item Bank VEC-T&I C/TB 7321, 7322, 7323.
1.2 Select wind types as to shape and configuration.	
1.3 Construct usable aircraft components of flyable aircraft.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 2: The learner will explain the operation of an aircraft airframe and engine systems.

Objectives		Measures
2.1	Show relationship of controls and control movement.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
2.2	Explain theory of flight, engine performance and instruments.	
2.3	Exhibit operation of selected engine instruments.	
2.4	Describe the installation of selected flight and engine instruments.	
2.5	Diagram aircraft fuel systems.	
2.6	Illustrate the electrical and ignition systems.	
2.7	List types of lubrication systems.	
2.8	Give description of the exhaust and induction systems.	
2.9	Label parts of the cooling system.	

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 3: The learner will use basic aviation hand tools according to course level.

Objectives	Measures
3.1 Match tool names with pictures or actual tools.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323
3.2 Select appropriate tools for designated tasks.	
3.3 Perform assigned task using accepted tools.	
3.4 Display accepted safety precautions.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 4: The learner will explain basic fixed wing aerodynamics.

Objectives	Measures
4.1 Describe the four sources of flight.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
4.2 Display the three axes of control.	
4.3 Interpret performance charts, tables, and computers.	
4.4 Recognize correct trade language of the aerospace aviation industry.	

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 5: The learner will identify the general stages of development of today's aircraft and space vehicles.

Objectives	Measures
5.1 Show awareness of feats of aviation aerospace pioneers and related developments by a written report on some aspect of aerospace aviation history.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 6: The learner will demonstrate a basic knowledge of the theory and practice of the weight and balance of small aircraft.

Objectives	Measures
6.1 Solve weight and balance problems by the computation, graph, and table methods.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
6.2 Accurately perform a weight and balance check on small airplane.	
6.3 Establish weight and balance data for light aircraft.	

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 7: The learner will apply knowledge of meteorology and forecasting to flight planning or other aviation-related activities.

Objectives	Measures
7.1 State meteorological theory to support weather changes and forecasts.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
7.2 Accurately interpret aviation-related weather reports and forecasts.	
7.3 Use weather charts, weather briefings, an understanding of weather hazards, and teletype reports in flight planning.	

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 8: The learner will utilize the flight computer in all computations such as wind, off-course, radius of action, and other aviation-related problems.

Objectives	Measures
8.1 Perform basic aviation calculations.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
8.2 Display computer skills by selecting correct solutions to varied types of problems.	
8.3 Develop flight plans or navigation logs using the flight computer.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 9: The learner will describe use of dead reckoning and pilotage navigation.

Objectives	Measures
9.1 Match symbols to the appropriate items selected from aeronautical charts.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
9.2 Locate and identify points on charts using coordinates.	
9.3 Exhibit proper uses of the navigation plotter in measurement of courses and distances.	
9.4 Select charts best suited to each individual operation.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 10: The learner will accurately prepare a complete navigation log for simulated or actual cross-country flight.

Objectives	Measures
10.1 Select routes for the most efficient and safe operations.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 11: The learner will construct the wind triangle.

Objectives	Measures
11.1 List the procedures for constructing the wind triangle.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
11.2 Identify the elements of a wind triangle.	

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 12: The learner will describe early navigation tools and procedures.

Objectives	Measures
12.1 Identify early navigation tools and equipment.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 13: The learner will describe VOR navigation.

Objectives	Measures
13.1 List advantages and disadvantages of VOR navigation.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
13.2 State function of VOR indicators.	
13.3 Describe VOR navigation procedures.	

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 14: The learner will use the automatic direction finder.

Objectives	Measures
14.1 Establish approximate positions using ADF bearings.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 15: The learner will describe current radio aid used in light aircraft.

Objectives	Measures
15.1 Describe DME and area navigation.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
15.2 Explain transponder and radar operation.	

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 16: The learner will prepare a navigation log and fly cross-country using radio navigation and radio aids.

Objectives	Measures
16.1 Prepare a sample navigation log.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
16.2 List the procedures for IFR cross-country flying.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 17: The learner will select safe operating procedures for tools and equipment.

Objectives	Measures
17.1 Perform safety check in shop.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
17.2 List rules of safety.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 18: The learner will recognize career and occupational opportunities in the aerospace industry.

Objectives	Measures
18.1 Describe careers other than flying aircraft associated with the aerospace industry.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
18.2 Describe careers as pilots associated with the aerospace industry.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 19: The learner will identify aerospace fields warranting for further study.

Objectives	Measures
19.1 Identify related jobs that depend upon aviation knowledge and skills.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
19.2 Show an awareness of opportunities in aviation corresponding to desired educational levels.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 20: The learner will describe use of microphone using accepted phraseology.

Objectives	Measures
20.1 Perform correct radio procedures per FFA & FCC regulations.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 21: The learner will describe the aircraft communications equipment used in light aircraft.

Objectives	Measures
21.1 List the communications equipment used in light aircraft.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
21.2 Discuss the proper use of communication equipment in light aircraft.	

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 22: The learner will recognize Morse Code letters by sight and sound.

Objectives	Measures
22.1 Identify Morse Code letters by sight and sound.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
22.2 Transcribe a message in Morse Code by sight and sound.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 23: The learner will describe Federal Aviation Administration Regulations.

Objectives	Measures
23.1 Recognize definitions of general interest to the student or private pilot.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323
23.2 Locate regulations pertaining to desired subject.	
23.3 Select correct requirements for issuance of ratings and certificates.	
23.4 Select appropriate procedures for aircraft operations.	
23.5 Interpret rules pertaining to aircraft safety.	

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 24: The learner will identify appropriate materials for making up aircraft components.

Objectives	Measures
24.1 Describe desirable properties in aircraft materials.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
24.2 Describe the treatment of aircraft metals.	
24.3 List new aircraft construction materials.	
24.4 Use actual materials in construction projects.	
24.5 Identify hardware by marks and symbols.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 25: The learner will recognize defects in aviation materials and parts.

Objectives	Measures
25.1 Identify defects in aviation materials and parts.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
25.2 Identify the correct procedures when defects are determined.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 26: The learner will interpret plans and specifications of aircraft or aircraft components.

Objectives	Measures
26.1 Identify lines and symbols found on working drawings.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
26.2 Create patterns for new or replacement parts.	

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 27: The learner will construct aircraft parts from designated plans.

Objectives	Measures
27.1 Identify types of structures used in aircraft construction.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
27.2 List nomenclature of various components.	
27.3 Recognize the five types of stress and their effect on aircraft structures.	
27.4 Perform basic stress and load calculations.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 28: The learner will explain stability as it relates to the three control axes of the airplane.

Objectives	Measures
28.1 List corrective measures for improving longitudinal stability.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
28.2 List methods use to improve lateral stability.	
28.3 State theoretical factors affecting directional instability and indicate corrective measures required to regain stability.	

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 29: The learner will identify primary and auxiliary control devices for conventional and STOL aircraft.

Objectives	Measures
29.1 List primary control devices for conventional and STOL aircraft.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
29.2 List auxiliary control devices for conventional and STOL aircraft.	

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 30: The learner will explain design characteristics in the engineering of aircraft engines and instruments.

Objectives	Measures
30.1 List design characteristics of aircraft engines and instruments.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
30.2 Discuss the theory of aircraft engine and instrumentation design.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 31: The learner will evaluate structural design changes, new construction materials, new engines, and fuels used in modern aircraft.

Objectives	Measures
31.1 Evaluate structural design changes in aircraft.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
31.2 List materials, engines, and fuel types used in different aircraft.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 32: The learner will identify types of reciprocating and reaction engines for aircraft.

Objectives		Measures
32.1	Identify reciprocation engine types for aircraft.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
32.2	Identify reaction engine types for aircraft.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 33: The learner will demonstrate the operation of the aircraft reciprocating engine.

Objectives	Measures
33.1 Dismantle and assemble simple aircraft engine, while explaining its operation.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 34: The learner will recognize and explain the function of various reaction engine parts.

Objectives	Measures
34.1 Identify functions of various engine parts.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
34.2 Discuss functions of various engine parts.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 35: The learner will study space flight history.

Objectives	Measures
35.1 Describe the theory and practice of space flight.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
35.2 Discuss space flight history.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 36: The learner will describe how a body can be placed in space by referring to thrust, launching, escape velocity, orbits, and guidance systems.

Objectives	Measures
36.1 Describe payload insertion.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
36.2 List the criteria involved in payload insertion.	

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 37: The learner will identify five categories of space exploration and state benefits each has derived from the space program.

Objectives	Measures
37.1 Identify five categories of space exploration.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
37.2 Discuss the benefits of space exploration as it relates to science.	

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 38: The learner will interpret the effects of high altitude on the human body.

	Objectives	Measures
38.1	Explain symptoms of hypoxia and hyperventilation.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.

VOCATIONAL EDUCATION
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Grade Level: 10-12　　　　Skills/Subject Area: Aerospace

COMPETENCY GOAL 39: The learner will explain sensory effect of aircraft flight.

Objectives	Measures
39.1 Explain sensory effect of aircraft flight.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
39.2 Discuss IFR and VFR systems.	

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 40: The learner will summarize effects of drug and alcohol usage on the aircraft crew members.

Objectives	Measures
40.1 List the effects of drug and alcohol usage on aircraft crew members.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
40.2 Discuss the problems that may occur from alcohol and drug usage by crew members.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 41: The learner will know the different types of airports and runways.

Objectives	Measures
41.1 List the different types of airports.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
41.2 List the different types of runways.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 42: The learner will demonstrate traffic patterns for aircraft taking off and landing.

Objectives	Measures
42.1 Comment on traffic rules that apply to aircraft landing and taking off.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
42.2 List airport equipment, aids, and facilities related to air traffic.	

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Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 43: The learner will recognize air traffic rules.

Objectives	Measures
43.1 Select the various air traffic controls and their function.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
43.2 Describe emergency procedures.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 44: The learner will interpret problems associated with transonic flight.

Objectives	Measures
44.1 Explain structural changes and additions aiding high speed flight.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
44.2 Explain problems of high speed flight.	

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 45: The learner will understand rotary wing aerodynamics.

Objectives	Measures
45.1 List factors involved in helicopter operations.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
45.2 Explain helicopter controls and the function of each.	
45.3 Explain rotor types, listing an advantage of each.	

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 46: The learner will select necessary or desired information from the four parts of the *Airmans' Information Manual*.

Objectives	Measures
46.1 Identify the four parts of the *Airmans' Information Manual*.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
46.2 Discuss the aspects of the AIM.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 47: The learner will explain flight planning procedures.

Objectives	Measures
47.1 Explain flight planning procedures.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
47.2 List flight planning procedures.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 48: The learner will develop and use, or simulate use of, an operational flight plan.

Objectives	Measures
48.1 List parts of a flight plan.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
48.2 Develop a simulated flight plan.	

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Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 49: The learner will explain the social, cultural, economic, and political impact of the aerospace industry.

Objectives	Measures
49.1 List the significant milestones in aviation history.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
49.2 Discuss the social, cultural, economic, and political impact of aerospace technology.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 50: The learner will perform a preflight check using a check list.

Objectives	Measures
50.1 List the preflight procedures for a small aircraft.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
50.2 Demonstrate the correct preflight routine.	

Grade Level: 10-12 Skills/Subject Area: Aerospace

COMPETENCY GOAL 51: The learner will demonstrate basic flight maneuvers.

Objectives	Measures
51.1 List the basic flight maneuvers.	Refer to competency Test Item Bank VEC-T&I-C/TB 7321, 7322, 7323.
51.2 Discuss the procedures for making flight maneuvers.	

Auto Body Repair Outline

1. Introduction

    a. Orientation
    b. Safe working habits
    c. Paint and body shop safety procedures

2. Body and Frame Construction

    a. Identification of types of frame construction
    b. Identification of types of body construction

3. Auto Body Tools and Equipment

    a. Proper use of hand tools
    b. Proper use of body tools
    c. Proper use of power tools and equipment

4. Welding

    a. Fusion weld mild steel
    b. Brazing mild steel
    c. Brazing sheet aluminum
    d. Cutting mild steel
    e. Welding mild steel with electric arc welder
    f. Welding mild steel with gas metal arc welder
    g. Welding mild steel with gas tungsten
    h. Welding sheet aluminum with gas tungsten arc process
    i. Welding mild steel sheet metal

5. Basic Repair Procedures

    a. Preparation of damaged surface
    b. Roughing out and aligning
    c. Finishing metal
    d. Shrinking stretched areas
    e. Filling damaged areas

6. Hardware, Glass, and Trim

    a. Exterior moldings and trim
    b. Interior trim
    c. Hardware
    d. Automobile glass
    e. Types of fasteners used in automobile assembly

7. Major Damage Repair

   a. Use of measuring tools
   b. Using gauges and measuring devices
   c. Repairing frame and underbody damage
   d. Aligning body shell and body panels
   e. Outer body panels and mild steel sections
   f. Inner structural members and high strength steel components
   g. Leaks and noises

8. Suspension and Steering Systems

   a. Checking and repairing suspension systems
   b. Checking and repairing steering systems
   c. Checking wheel bearings
   d. Balancing tires

9. Plastic and Fiberglass Repair

   a. Fiberglass panels
   b. Soft plastic components
   c. Hard plastics
   d. Vinyl components

10. Refinishing

   a. Cleaning surface
   b. Sanding surface
   c. Removing paint from surface
   d. Masking vehicles
   e. Applying undercoat and topcoat materials
   f. Preparing for delivery
   g. Cleaning interior of car
   h. Installing stripes and decals

11. Estimates and Repair Orders

   a. Analyzing collision damage and writing estimates
   b. Writing repair orders

12. Electrical

   a. Servicing auto battery
   b. Testing and repairing electrical circuits

13. Cooling System

   a. Testing
   b. Repairing

14. Automotive Air Conditioning System

    a. Testing
    b. Repairing

15. Leadership

    a. Characteristics of a good leader
    b. Importance of parliamentary procedures
    c. Correct use of 17 parliamentary procedures
    d. VICA participation

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 1: The learner will identify auto body repair trades, occupational opportunities, and personal job requirements.

Objectives	Measures
1.1 Discuss the occupational outlook for auto body repair workers.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
1.2 List employment opportunities for auto body repair workers.	
1.3 Complete a personal information sheet.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12　　Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 2: The learner will practice safe work habits.

Objectives	Measures
2.1 List personal safety rules.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
2.2 List general shop safety rules.	
2.3 Match each type of fire with fire extinguishers best suited to extinguish each.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 3: The learner will practice paint and body shop safety procedures.

Objectives	Measures
3.1 List paint and body shop safety rules.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
3.2 List fire and explosion safety rules.	
3.3 List equipment safety rules.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 4: The learner will identify types of frame and body constructions.

Objectives	Measures
4.1 Identify the types of automobile frames.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
4.2 Identify conventional auto body panels and their location.	
4.3 Identify unitized body sections and panels.	

Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 5: The learner will use hand tools properly.

Objectives	Measures
5.1 Identify hand tools.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
5.2 Choose the proper hand tool for the job.	
5.3 Use and maintain hand tools properly.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 6: The learner will demonstrate the proper use of auto body tools.

Objectives	Measures
6.1 Identify auto body tools.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
6.2 Choose the proper tools for the job.	
6.3 Use and maintain auto body tools properly.	

Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 7: The learner will use power tools and body shop equipment properly.

Objectives	Measures
7.1 Identify auto body power tools.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
7.2 Identify auto body shop equipment.	
7.3 Maintain power tools and equipment.	
7.4 Use power tools and equipment safely.	

Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 8: The learner will fusion weld mild steel with oxyacetylene equipment.

Objectives	Measures
8.1 Demonstrate safe use of oxyacetylene welding equipment.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
8.2 Make butt welds on assorted thicknesses of mild steel.	
8.3 Make lap welds on assorted thicknesses of mild steel.	
8.4 Make recessed lap welds on mild steel sheet metal.	
8.5 Make buttonhole (plug) welds on mild steel sheet metal.	

Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 9: The learner will braze mild steel with oxyacetylene equipment.

Objectives	Measures
9.1 Make lap joints on mild steel sheet metal.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
9.2 Make recessed lap joints on mild steel sheet metal.	
9.3 Join mild steel sheet metal using buttonhole brazing.	

Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 10: The learner will braze sheet aluminum with oxyacetylene equipment.

Objectives	Measures
10.1 Make butt joints on sheet aluminum.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
10.2 Make lap joints on sheet aluminum.	
10.3 Make recessed lap joints on sheet aluminum.	

Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 11: The learner will cut mild steel with the oxacetylene torch.

Objectives	Measures
11.1 Cut assorted thicknesses of mild steel to specified dimensions.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.

Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 12: The learner will weld mild steel with the electric arc welder.

Objectives		Measures
12.1	Demonstrate safe use of the electric arc welding equipment.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
12.2	Make butt welds on assorted thicknesses of mild steel.	
12.3	Make lap welds on assorted thicknesses of mild steel.	

Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 13: The learner will weld mild steel and high strength low alloy steel with the gas metal arc welding process. (G.M.A.W. or M.I.G.)

Objectives	Measures
13.1 Demonstrate safe use of the G.M.A.W. equipment.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463,
13.2 Make lap welds on assorted thicknesses of mild steel.	
13.3 Make butt welds on assorted thicknesses of mild steel.	
13.4 Make recessed lap welds on mild steel sheet metal.	
13.5 Make spot welds on mild steel sheet metal.	
13.6 Make plug welds on mild steel and high strength steel sheet metal.	

Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 14: The learner will weld mild steel with the gas tungsten arc welding process (G.T.A.W. or T.I.G.).

Objectives	Measures
14.1 Demonstrate safe use of the G.T.A.W. equipment.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
14.2 Make butt welds on mild steel sheet metal.	
14.3 Make lap welds on mild steel sheet metal.	
14.4 Make recessed lap welds on mild steel sheet metal.	

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Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 15: The learner will weld sheet aluminum by the gas tungsten arc process.

Objectives	Measures
15.1 Make butt welds on sheet aluminum.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
15.2 Make lap welds on sheet aluminum.	
15.3 Make recessed lap welds on sheet aluminum.	

Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 16: The learner will weld mild steel sheet metal with the electric resistance spot welder.

Objectives	Measures
16.1 Make spot welds with twin lead electrodes.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
16.2 Make spot welds with the pinch gun.	

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Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 17: The learner will prepare damaged surfaces for repair.

Objectives		Measures
17.1	Remove and store molding and trim.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
17.2	Remove undercoating and body deadener from the backside of the panel.	
17.3	Clean exterior surface with proper materials.	

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TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 18: The learner will rough-out and align damaged sheet metal.

Objectives	Measures
18.1 Analyze collision damage.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
18.2 Determine correct repair procedures.	
18.3 Rough-out damaged area to general contour and align to adjoining panels.	

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TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 19: The learner will prepare metal for filling and refinishing.

Objectives	Measures
19.1 Use body file to locate high and low areas.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
19.2 Use hammers and dollies to remove high and low areas from the panels.	
19.3 Use the disc-sander to metal-finish damaged areas.	

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Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 20: The learner will shrink stretched areas of automobile sheet metal.

	Objectives	Measures
20.1	Prepare equipment needed to shrink stretched sheet metal with heat.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
20.2	Use heat to expand and soften area to be shrunk.	
20.3	Use hammer and dolly to drive down and straighten expanded metal.	
20.4	Quench the metal with water.	

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Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 21: The learner will fill damaged areas with plastic fillers and body solder.

Objectives	Measures
21.1 Select filler to be used.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
21.2 Prepare the surface for filler.	
21.3 Apply filler material.	
21.4 Finish filler to proper contour.	

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Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 22: The learner will remove and replace exterior moldings and trim.

Objectives	Measures
22.1 Remove and replace nameplates.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
22.2 Remove and replace metal moldings and fasterners.	
22.3 Remove and replace adhesive type moldings.	

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Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 23: The learner will remove and replace interior trim.

Objectives	Measures
23.1 Remove and replace seats and restraint system components.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
23.2 Remove and replace floor mats.	
23.3 Remove and replace door and quarter trim.	
23.4 Remove and replace headliners.	

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Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 24: The learner will remove and replace hardware.

Objectives	Measures
24.1 Remove and replace door locks, remote controls, door handles, and lock cylinders.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
24.2 Remove and replace window regulators, stops, run channels, and guides.	
24.3 Remove and replace weather stripping.	

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Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 25: The learner will remove and replace automobile glass.

Objectives	Measures
25.1 Remove, replace, and align door and vent glass.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
25.2 Remove, replace, and align quarter glass.	
25.3 Remove, replace, and align station wagon tailgate glass.	
25.4 Remove and replace rubber gasket type windshield and back glass.	
25.5 Remove and replace windshields and back windows bonded with ribbon adhesive, butyl rubber, and urethane adhesives.	

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Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 26: The learner will identify the types of fasteners used in automobile assembly.

Objectives	Measures
26.1 Identify the types of bolts, nuts, and washers used in automobiles.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
26.2 Identify types of rivets used in automobiles.	
26.3 Identify types of screws used in automobiles.	

Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 27: The learner will use measuring tools to measure objects to proper dimensions.

Objectives	Measures
27.1 Use rule and tape to measure proper dimensions.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
27.2 Draw lines and objects to proper dimensions.	

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Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 28: The learner will use gauges and measuring devices to locate and identify collision damage.

Objectives	Measures
28.1 Use steel tape and tram gauge to locate and identify body and frame damage.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
28.2 Use dimension charts, center line, and datum gauges to diagnose frame and unitized underbody damage.	

Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 29: The learner will repair frame and underbody damage.

Objectives	Measures
29.1 Identify types of frame equipment.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
29.2 Explain proper hookups and anchoring methods.	
29.3 Straighten damaged components and sections.	
29.4 Remove and replace damaged frame members.	

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Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 30: The learner will align body shell and body panels.

Objectives	Measures
30.1 Measure to locate and diagnose damage.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
30.2 Make repair procedure plan.	
30.3 Rough-out damaged area.	
30.4 Straighten and align body panels.	

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Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 31: The learner will remove and replace outer body panels and mild steel section.

	Objectives	Measures
31.1	Remove and replace bolt on doors, hoods, and deck lids.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
31.2	Remove and replace doors, hoods, and deck lids that use welded hinges.	
31.3	Remove and replace bolt on fenders.	
31.4	Remove and replace outer door panels.	
31.5	Remove and replace welded-on outer panels.	
31.6	Remove and replace bumper assemblies.	

Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 32: The learner will remove and replace inner structural members and high strength steel components.

Objectives		Measures
32.1	Demonstrate proper procedures for removing members at factory joints.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
32.2	Demonstrate correct methods for preparing and fitting joints.	
32.3	Demonstrate proper methods for welding members in place.	
32.4	Demonstrate proper methods for weatherproofing welded joints.	

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Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 33: The learner will locate and eliminate leaks and noises.

Objectives	Measures
33.1 Conduct tests to locate causes of leaks and noises.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
33.2 Make repairs or adjustments to eliminate problems.	
33.3 Perform a test to determine that problem has been eliminated.	
33.4 Clean up after repairs.	

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Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 34: The learner will check and repair suspension systems.

Objectives		Measures
34.1	Identify types of front suspension systems.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
34.2	Identify types of rear suspension systems.	
34.3	Identify suspension angles and explain how each affects the operation of the automobile.	
34.4	Locate and replace damaged or worn suspension components.	
34.5	Adjust suspension angles to specifications.	

Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 35: The learner will check and repair steering systems.

Objectives		Measures
35.1	Identify types of steering systems.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
35.2	Identify damaged or worn components.	
35.3	Replace and adjust damaged steering components.	

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Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 36: The learner will check wheel bearings.

Objectives	Measures
36.1 Remove, clean, and inspect wheel bearings.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
36.2 Lubricate, replace, and adjust wheel bearings.	

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Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 37: The learner will balance tires.

Objectives	Measures
37.1 Demonstrate the ability to static balance tires.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
37.2 Demonstrate the ability to dynamic balance tires.	

Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 38: The learner will repair fiberglass panels.

Objectives	Measures
38.1 Repair scratched and gouged fiberglass panels.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
38.2 Repair cracked and broken fiberglass panels.	
38.3 Remove and replace damaged fiberglass panels.	

Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 39: The learner will repair soft plastic components.

Objectives	Measures
39.1 Repair soft plastic parts with flexible plastic repair materials and structural adhesives.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
39.2 Refinish soft plastic with flexible materials.	

Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 40: The learner will repair hard plastics by hot air welding.

Objectives	Measures
40.1 Perform tests to identify types of plastics.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
40.2 Identify types of plastics that may be welded and select repair materials.	
40.3 Set up equipment, weld, and shape joints.	
40.4 Refinish hard plastics.	

Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 41: The learner will repair vinyl components.

Objectives	Measures
41.1 Repair vinyl tops.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
41.2 Remove and replace vinyl tops.	
41.3 Repair interior vinyl materials.	
41.4 Refinish vinyl materials.	

Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 42: The learner will clean a surface to be refinished.

	Objectives	Measures
42.1	Remove trim from areas to be refinished.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
42.2	Wash surfaces with detergents to remove dirt.	
42.3	Remove wax, grease, silicon, and other contaminants with proper solvent cleaners.	

Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 43: The learner will sand a surface to be refinished.

Objectives	Measures
43.1 Select the sanding method to be used.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
43.2 Select the proper abrasives for the job.	
43.3 Demonstrate proper sanding procedures.	

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Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 44: The learner will remove paint from a surface to be refinished.

Objectives	Measures
44.1 Select the best method to remove paint from the surface.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
44.2 Remove paint from the surface following proper safety procedures.	
44.3 Clean all surfaces after stripping the area to be refinished.	
44.4 Treat metal surfaces with proper metal conditioners.	
44.5 Neutralize metal conditioners and dry surface before applying undercoat materials.	

Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 45: The learner will mask vehicles for refinishing.

Objectives	Measures
45.1 Cover molding with proper width masking tape.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
45.2 Cover grilles, bumpers, glass, and adjoining areas with proper width masking paper.	
45.3 Remove masking after refinishing materials dry.	

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Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 46: The learner will apply undercoat and topcoat materials to refinish automobiles.

Objectives	Measures
46.1 Maintain air supply system.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
46.2 Select, prepare, and apply proper undercoats.	
46.3 Select and prepare topcoat materials.	
46.4 Adjust spray equipment and spray topcoat material as required.	
46.5 Clean and store spray equipment.	

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Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 47: The learner will prepare refinished automobiles for delivery.

Objectives	Measures
47.1 Buff and hand compound a lacquer spot repair with the proper compound.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
47.2 Buff and compound complete panels refinished with lacquer.	
47.3 Remove overspray and clean glass and chrome.	

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Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 48: The learner will clean the interior of car.

Objectives	Measures
48.1 Vacuum interior and luggage compartment.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
48.2 Clean upholstery materials.	
48.3 Clean floor mats.	

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Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 49: The learner will install stripes and decals.

Objectives	Measures
49.1 Clean and prepare surface.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
49.2 Apply stripes using striping tape.	
49.3 Apply stripes using striping roller.	
49.4 Apply vinyl tape stripes.	
49.5 Layout and apply decals.	

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Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 50: The learner will analyze collision damage and write estimates of the repair.

Objectives		Measures
50.1	Select crash guides and manuals required to make the repair estimate.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
50.2	Record information about the owner of the vehicle.	
50.3	Record all vehicle identification information.	
50.4	Inspect damage by body units.	
50.5	Record replacement parts' prices, part numbers, and all labor cost.	
50.6	Record all sublet items.	
50.7	Total labor, parts, and sublet costs.	
50.8	Compute the sales tax on all parts.	
50.9	Total the estimate.	

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Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 51: The learner will write repair orders.

Objectives	Measures
51.1 Record owner informtion.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
51.2 Record vehicle identification information.	
51.3 Record delivery time and location of delivery.	
51.4 List repairs to be performed.	
51.5 List damage not to be repaired.	
51.6 Have authorized person sign repair authorization.	
51.7 List parts and prices.	
51.8 Record all charges.	
51.9 Total Costs.	
51.10 Route copies to proper department.	

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Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 52: The learner will test and service an auto battery.

Objectives		Measures
52.1	Clean battery terminals.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
52.2	Check battery electrolyte level.	
52.3	Check electrolyte specific gravity.	
52.4	Hook up battery charger and charge battery properly.	
52.5	Remove and replace a battery.	

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Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 53: The learner will test and repair electrical circuits.

Objectives	Measures
53.1 Use wiring diagrams to trace circuits.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
53.2 Use test light, voltmeter, and ohmmeter to check wiring circuits for shorted and open circuits and proper ground.	
53.3 Repair damaged automotive wiring.	
53.4 Remove and replace bulbs.	
53.5 Align headlamps.	
53.6 Remove, test, and replace a power window motor.	
53.7 Test and repair power seat electrical components.	

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Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 54: The learner will test and repair a cooling system.

Objectives		Measures
54.1	Pressure test the cooling system and cap.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
54.2	Remove and replace radiator and hoses.	
54.3	Remove and replace fan and water pump.	
54.4	Remove, inspect, replace, and adjust belts.	
54.5	Check coolant level and specific gravity of antifreeze solution.	

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Grade Level: 10-12 Skills/Subject Area: Auto Body Repair

COMPETENCY GOAL 55: The learner will test and repair the air conditioning system.

Objectives	Measures
55.1 Use gauge set to test air conditioning system.	Refer to competency Test Item Bank VEC-T&I-C/TB 7461, 7462, 7463.
55.2 Test air conditioning system for refrigerant leaks.	
55.3 Remove and replace air conditioning condenser.	
55.4 Remove and replace refigerant lines and hoses.	
55.5 Remove and replace receiver/dryer.	
55.6 Remove and replace compressor.	
55.7 Remove and replace clutch and pulley.	
55.8 Remove and replace evaporator.	
55.9 Evacuate system with vacuum pump.	
55.10 Charge system according to proper procedures and specifications.	

Auto Mechanics Outline

1. Work Habits and General Competencies

    a. Oral and written instructions
    b. Work habits
    c. Positive attitude towards safety
    d. Communicate ideas
    e. Occupational opportunities and requirements

2. Introduction to Shop Practices

    a. Identification of tools and materials
    b. Processes and usage
    c. Safe shop procedures
    d. Maintenance of tools and equipment

3. Automotive Maintenance

    a. Identification of maintenance problems
    b. Lubrication and filtration
    c. Cooling system maintenance
    d. Tire, wheels, and steering maintenance
    e. Electrical system maintenance

4. Engines

    a. Internal combustion engines
    b. Spark ignition and compression engines
    c. Minor/major repair to engines
    d. Overhaul of engines

5. Cooling Systems

    a. Identification and function
    b. Diagnosing malfunctions
    c. Service, remove, repair, and replace

6. Air Conditioning Systems

    a. Identification and function
    b. Theory and operation
    c. Diagnosing and troubleshooting
    d. Install, service, and repair

7. Fuel Systems

   a. Identification and function
   b. Theory of carburetion and fuel injection
   c. Malfunctions
   d. Service, remove, repair, or replace

8. Electrical Systems

   a. Identification and function
   b. Electrical and electronic theory
   c. Use equipment to diagnose and to correct problems
   d. Service, remove, repair, or replace

9. Ignition Systems

   a. Identification and Function
   b. Theory of electricity and electronics
   c. Use equipment to diagnose and correct problems
   d. Service, remove, repair, or replace

10. Exhaust and Emission Control

   a. Identification and function
   b. Theory of pollution control systems and environmental hazards
   c. Use equipment to diagnose and correct problems
   d. Adjust, service, repair, or replace
   e. Identification of components to be inspected, tested, adjusted, repaired, or replaced
   f. Theory of operation
   g. Fuel electrical ignition and emission control problems
   h. Adjust, service, repair, and replace fuel, electrical, mechanical components

11. Brake System

   a. Identification and function
   b. Braking system problems
   c. Adjust, service, repair, or replace

12. Steering and Suspension

   a. Identification of components and types
   b. Steering and suspension geometry
   c. System problems
   d. Adjust, remove, repair, or replace

13. Clutch and Transmissions

    a. Types and functions
    b. Theory of manual and hydraulic clutches and automatic transmissions
    c. Diagnosing problems
    d. Adjust, remove, repair, or replace

14. Differential and Rear Axle

    a. Identification and function
    b. Theories of gears, gearing, differentials, and limited slip drives
    c. Inspect, measure, adjust, repair, or replace

15. Leadership

    a. Characteristics
    b. Importance of parliamentary procedure
    c. Correct use of 17 parliamentary procedures
    d. VICA participation

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Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 1: The learner will follow oral or written instructions for performing job tasks.

Objectives	Measures
1.1 Read written instructions and/or specifications accurately.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
1.2 Explain oral directions clearly.	

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COMPETENCY GOAL 2: The learner will demonstrate acceptable work habits and behavior.

Objectives	Measures
2.1 Explain shop procedures and practices.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
2.2 Work cooperatively with fellow students and supervisors.	
2.3 Handle materials, tools, and equipment in a responsible manner.	
2.4 Maintain work area in an acceptable manner.	
2.5 Maintain appropriate personal hygiene and appearance.	
2.6 Perform work of consistently good quality.	

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Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 3: The learner will demonstrate a positive attitude towards safety.

	Objectives	Measures
3.1	Explain shop rules related to safety.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
3.2	Follow prescribed safety procedures in performing job tasks.	
3.3	Wear appropriate personal protective equipment consistently.	

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COMPETENCY GOAL 4: The learner will communicate ideas effectively to individual and to groups.

Objectives	Measures
4.1 Demonstrate the ability to complete a task from verbal instructions.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
4.2 Demonstrate the ability to complete a task from work order forms.	

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COMPETENCY GOAL 5: The learner will describe occupational opportunities and requirements.

	Objectives	Measures
5.1	Describe the types of occupational opportunities and related fields in auto mechanics.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
5.2	Describe types of automotive shop facilities.	
5.3	Describe automotive shop operating procedures and practices.	
5.4	Interpret the relationship between worker productivity and consumer prices in a free enterprise system.	

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COMPETENCY GOAL 6: The learner will name and describe the use of the tools and reference materials used in automotive mechanics.

Objectives	Measures
6.1. Identify and describe the use of automotive mechanics hand tools.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
6.2 Identify and describe the use of major equipment in the automotive mechanics shop.	
6.3 Identify and describe the use of automotive mechanics shop manuals, specifications, and reference materials.	
6.4 Identify and describe the use of measuring tools and test equipment.	

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COMPETENCY GOAL 7: The learner will identify and explain correct, safe shop procedures and practices.

	Objectives	Measures
7.1	Describe shop operating procedures.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
7.2	Describe safe procedures for use of hand tools and equipment.	
7.3	Describe safe procedures for use of hoists, jacks, and stands.	
7.4	Describe safe procedures for use of fuels, oils, and solvents.	
7.5	Describe safe procedures for ventilation and exhaust control.	
7.6	Describe safe procedures for use of cleaning equipment.	
7.7	Describe the correct application and use of fire extinguishers for class A, B, and C fires.	

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COMPETENCY GOAL 8: The learner will demonstrate the correct use and maintenance of automotive tools and equipment.

Objectives	Measures
8.1 Demonstrate the correct use of common hand tools.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
8.2 Demonstrate the correct use of nonprecision and precision measuring test tools and equipment.	
8.3 Clean engines and engine components safely with appropriate equipment.	
8.4 Remove and replace bearings, seals, and components safely using arbor and hydraulic presses.	

Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 9: The learner will identify and describe the most common automotive maintenance problems.

Objectives		Measures
9.1	List ten most common automotive problems resulting from lack of scheduled maintenance.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
9.2	List advantages resulting from scheduled tune-up and proper vehicle maintenance.	

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COMPETENCY GOAL 10: The learner will describe automotive lubrication systems and their components.

Objectives	Measures
10.1 Explain the theories of lubrication.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
10.2 Describe characteristics and classification systems of lubricants.	
10.3 Locate specifications and reference materials related to lubrication.	

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COMPETENCY GOAL 11: The learner will perform routine automotive maintenance related to lubrication and filtration.

	Objectives	Measures
11.1	Operate lifting equipment.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
11.2	Drain oil, remove, and replace oil filter, refill crankcase.	
11.3	Check lubrication level and fill standard transmission.	
11.4	Check fluid level and fill automatic transmission.	
11.5	Check lubrication level and fill a differential.	
11.6	Lubricate a vehicle chassis.	
11.7	Inspect and service air and crankcase filters.	

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COMPETENCY GOAL 12: The learner will perform routine maintenance related to cooling systems.

Objectives	Measures
12.1 Inspect and correct coolant level.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
12.2 Inspect belts for condition and tension-adjust or replace.	
12.3 Inspect and replace hoses.	
12.4 Inspect and test caps, thermostats.	

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Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 13: The learner will perform routine maintenance on tires, wheels, and the steering brake system.

	Objectives	Measures
13.1	Inspect tires for air pressure and inflate.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
13.2	Inspect tires for wear.	
13.3	Inspect power steering unit for fluid level and fill.	
13.4	Inspect and fill a master cylinder.	
13.5	Inspect and adjust wheel bearings.	

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COMPETENCY GOAL 14: The learner will perform routine maintenance on the electrical system.

Objectives	Measures
14.1 Inspect battery for electrolyte level, cleanliness of case and terminals, and service it.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
14.2 Inspect lighting system, remove and replace headlamps and bulbs.	
14.3 Recharge battery safely.	

Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 15: The learner will identify the basic types of internal combustion engines and their components.

	Objectives	Measures
15.1	Describe the construction of single and multi-cylinder piston and rotary gasoline-fueled internal combustion engine.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
15.2	Describe the construction of compression ignition engines.	

Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 16: The learner will explain the theory of operation for spark ignition and compression ignition engines.

Objectives	Measures
16.1 List steps leading to final combustion in a spark ignition engine.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
16.2 List steps leading to final combustion in a compression ignition engine.	

Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 17: The learner will diagnose the need for minor or major repair to automotive engines and components using appropriate test equipment.

Objectives	Measures
17.1 List minor repairs on a typical engine and select test equipment to analyze problems.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
17.2 List major repairs on a typical engine and select test equipment to analyze problems.	

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Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 18: The learner will follow established standards in overhauling automotive engines and components.

	Objectives	Measures
18.1	Remove and/or replace automotive engine, components, and accessories from a chassis utilizing appropriate hoist and safety equipment.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
18.2	Disassemble, clean, inspect, and service cylinder heads.	
18.3	Reface valves and valve seats using appropriate equipment.	
18.4	Inspect cylinders for wear, out-of-round, taper and ring ridge using appropriate measuring tools.	
18.5	Inspect pistons, rings, piston pins, and connecting rods with appropriate measuring tools and service or replace.	
18.6	Inspect crank shaft, and connect rod surface and bearings for condition with appropriate measuring tools.	
18.7	Remove ridge ring on top of cyliner using a cylinder reamer.	
18.8	Deglaze or hone cylinder.	
18.9	Fit a piston.	

Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 18: The learner will follow established standards in overhauling automotive engines and components.

Objectives	Measures
18.10 Select and install piston rings.	
18.11 Disassemble, clean, and test hydraulic lifters.	
18.12 Inspect camshaft and measure for wear.	
18.13 Measure connecting rod and main bearing clearances using plastigage.	
18.14 Replace camshaft bearing.	
18.15 Replace oil pans, covers, and gasket assemblies.	
18.16 Replace engine in chassis.	
18.17 Start, adjust, and check engine for leaks.	

Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 19: The learner will identify and explain the function of basic types of automovtive cooling systems and their components.

	Objectives	Measures
19.1	Identify the components of liquid and air cooling systems and explain their function. Explain the theory and operation of liquid and air cooling systems.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
19.2	Compare temperature ranges to quantities of coolants needed.	

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Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 20: The learner will diagnose cooling system malfunctions.

Objectives		Measures
20.1	Measure specific gravity of coolant using a hydrometer.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
20.2	Test pressure cap and thermostat operation using a pressure tester.	
20.3	Inspect radiator hose for deterioration; remove and replace.	
20.4	Pressure test a cooling system for internal and external leaks.	
20.5	Inspect a fan belt for correct tension.	

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Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 21: The learner will service, remove, repair, and replace cooling system components.

Objectives	Measures
21.1 Test, remove, and replace a variable speed fan.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
21.2 Remove and replace a water pump.	
21.3 Remove and replace a thermostat.	
21.4 Reverse flush a radiator using a flushing gun.	
21.5 Reverse flush an engine block and head, using a reverse flushing gun.	
21.6 Test, remove, and replace a heat gauge sensor unit.	
21.7 Remove and replace core hole plugs.	

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Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 22: The learner will identify basic types of air conditioning and heating systems and their components, and explain their functions.

	Objectives	Measures
22.1	List basic types of air conditioning and heating systems used on a typical vehicle.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
22.2	Describe component parts and record their functions.	

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Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 23: The learner will explain the theory and operation of air conditioning and heating systems.

Objectives	Measures
23.1 List steps involved in the air flow related to air conditioning and heating systems.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
23.2 List steps in the mechanical operation of the air conditioning and heating systems.	

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COMPETENCY GOAL 24: The learner will diagnose and troubleshoot problems in air conditioning and heating systems and their components.

Objectives	Measures
24.1 List typical steps found in the diagnostic and troubleshooting procedure relative to air conditioning and heating systems.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
24.2 Describe component parts and record functions.	

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COMPETENCY GOAL 25: The learner will install, service, and repair automotive air conditioning systems and components.

Objectives	Measures
25.1 Charge and test air conditioning units.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
25.2 Remove and replace component parts of air conditioning system.	

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COMPETENCY GOAL 26: The learner will identify the basic types of fuel systems, their components, and explain their functions.

Objectives	Measures
26.1 Describe the six carburetor systems and their function.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
26.2 Identify and describe the electronic and mechanical fuel injection systems, their components and explain their functions.	

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COMPETENCY GOAL 27: The learner will explain the theory of carburetion and fuel injection.

Objectives	Measures
27.1 Explain the functions of the seven carburetor circuits.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
27.2 Summarize the operating principles of a typical carburetor.	
27.3 Describe the major parts of a fuel injection system.	
27.4 Summarize the operating principles of gasoline and diesel injection systems.	

Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 28: The learner will diagnose fuel system malfunctions.

Objectives	Measures
28.1 Test fuel pump vacuum, pressure, and volume.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
28.2 Test carburetor low speed, high speed pump, and power systems using an air fuel ratio meter.	

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COMPETENCY GOAL 29: The learner will service, remove, repair, or replace fuel system components.

Objectives		Measures
29.1	Remove, inspect, and replace a dry type carburetor cleaner.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
29.2	Remove, inspect, and/or replace a fuel filter.	
29.3	Adjust carburetor air/fuel ratio mixture.	
29.4	Adjust idle speed using a dwelltach meter.	
29.5	Remove and replace a fuel pump.	
29.6	Remove and replace a carburetor.	
29.7	Remove, rebuild, bench adjust, and replace a carburetor.	
29.8	Perform final adjustments on a carburetor.	

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Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 30: The learner will identify the basic automotive electrical systems, their components, and explain their functions.

Objectives		Measures
30.1	Identify the components of the automotive ignition system and explain their functions.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
30.2	Identify the components of the automotive charging system and explain their functions.	
30.3	Identify components of the automotive lighting and accessory system and explain their function.	

Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 31: The learner will explain basic electrical and electronic theory as related to automotive application.

Objectives	Measures
31.1 Explain the effects of magnetism.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
31.2 Summarize the operating principles of a starting and charging system, and their relationship to troubleshooting engine failure.	

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COMPETENCY GOAL 32: The learner will select and use appropriate test equipment to diagnose and/or correct problems in automotive electronic systems.

Objectives		Measures
32.1	Test the specific gravity of a battery using a hydrometer.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
32.2	Perform a battery capacity test.	
32.3	Test starter armature, field circuit, and insulated brush holders for grounds, shorts, and opens, using appropriate test equipment.	
32.4	Test alternator output and regulator operation using appropriate test equipment.	
32.5	Test alternator rotor and stator windings, diodes for grounds, shorts, and opens, using appropriate equipment for testing.	
32.6	Perform starter no load bench test.	
32.7	Perform "on engine" starter load tests.	

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COMPETENCY GOAL 33: The learner will service, remove, repair, or replace starting, charging, lighting, and accessory system components.

Objectives		Measures
33.1	Check electrolyte level in a battery and refill.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
33.2	Remove, disassemble, and inspect starting motor drive and solenoid for wear and visible defects.	
33.3	Remove and replace a starting solenoid.	
33.4	Remove and replace a set of starter brushes.	
33.5	Remove, disassemble, repair, and replace an alternator.	
33.6	Replace starting motor and components.	
33.7	Remove, replace, and adjust sealed beam headlight units.	
33.8	Remove and replace bulbs and fuses.	
33.9	Recharge battery.	

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COMPETENCY GOAL 34: The learner will identify basic types of automotive ignition systems, their components, and explain functions.

Objectives	Measures
34.1 Describe the conventional ignition systems and components.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
34.2 Describe the electronic ignition system and component.	

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COMPETENCY GOAL 35: The learner will explain the theories of electricity and electronics as related to automotive ignition systems.

Objectives	Measures
35.1 Explain the theories of electric/ electronic ignition systems.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
35.2 List the components in ignition systems.	

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COMPETENCY GOAL 36: The learner will diagnose and/or correct problems in automotive electrical and electronic ignition systems using appropriate test equipment and reference materials.

	Objectives	Measures
36.1	Test an ignition coil for polarity and continuity.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
36.2	Test an ignition condenser for capacity, resistance, and leakage.	
36.3	Test distributor vacuum advance unit using a vacuum pump, timing light, or distributor machine tester.	
36.4	Test distributor centrifugal advance unit using a timing light or distributor machine tester.	
36.5	Perform a cylinder balance test using an engine analyzer.	
36.6	Perform an ignition analysis test using an oscilloscope.	
36.7	Test spark plug cable resistance using ohmmeter.	
36.8	Test electronic ignition system.	

Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 37: The learner will service, remove, repair, or replace ignition system components.

Objectives		Measures
37.1	Remove, inspect, regap, and replace spark plugs.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
37.2	Remove, inspect, and replace spark plug cables.	
37.3	Adjust ignition timing to specifications using a timing light.	
37.4	Replace ignition points and adjust dwell using a dwell-tach meter.	
37.5	Replace electronic ignition system components.	

Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 38: The learner will identify basic types of exhaust and emission control systems, their components, and explain, their functions.

Objectives	Measures
38.1 List the basic types of exhaust and emission control systems.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
38.2 Explain the functions of the exhaust and emission control components.	

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Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 39: The learner will explain theory of pollution control systems and environmental hazards due to emissions.

Objectives	Measures
39.1 Discuss the theory of pollution control systems.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
39.2 Discuss the theory of environmental hazards due to emissions.	
39.3 List the health hazards associated with high emission output.	

Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 40: The learner will diagnose and/or correct problems in automotive exhaust and emission control systems using appropriate test equipment and reference materials.

Objectives	Measures
40.1 Identify the correct test equipment to be used for diagnosing exhaust and emission control systems.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
40.2 List the proper procedures to be used for testing emission control systems.	

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COMPETENCY GOAL 41: The learner will adjust, service, repair, or replace exhaust emission control system and components.

	Objectives	Measures
41.1	Identify and correct excessive noise and external leaks in an exhaust system.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
41.2	Remove and replace exhaust system components.	
41.3	Inspect and repair an exhaust manifold heat control valve.	
41.4	Remove, test, clean, and replace a PCV valve.	
41.5	Remove, repair, and/or replace defective components of emission control systems according to manufacturer's specifications.	

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Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 42: The learner will identify basic systems and components to be inspected, tested, adjusted, repaired, or replaced to restore them to manufacturer's performance specifications.

Objectives		Measures
42.1	Describe the fuel system and its components.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
42.2	Describe the electrical system and its components.	
42.3	Describe the ignition system and its components.	
42.4	Describe exhaust and emission control systems and their components.	
42.5	Describe the engine mechanical system.	

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Grade Level: 10-12 Skills/Subject Area: Auto Mechanic

COMPETENCY GOAL 43: The learner will explain basic theory of internal combustion engine operation.

Objectives	Measures
43.1 Explain basic theory of electricity, electronics, and magnetism.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
43.2 Explain basic theory of fuels and fuel systems.	
43.3 Explain basic theory of emissions and control systems.	
43.4 Explain basic theory of engine mechanical systems.	

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Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 44: The learner will diagnose fuel, electrical, ignition, and emission control problems.

Objectives	Measures
44.1 List the procedures for diagnosing problems in fuel, electrical, ignition, and emission control control systems.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
44.2 Match the proper test equipment to the system being tested.	

Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 45: The learner will adjust, service, repair, and replace fuel, electrical, mechanical, and emission control system components.

	Objectives	Measures
45.1	Service battery and starting system.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
45.2	Remove, clean, adjust, and replace spark plugs.	
45.3	Service or replace and adjust primary ignition system components.	
45.4	Service or replace and adjust secondary ignition system components.	
45.5	Service, replace, and adjust charging system components.	
45.6	Service, replace, and adjust fuel system component.	
45.7	Service, replace, and adjust emission systems components.	

Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 46: The learner will identify basic types of brake systems, their components, and explain their functions.

Objectives	Measures
46.1 List the basic types of brake components.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
46.2 Discuss the operating procedures of brake systems.	

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Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 47: The learner will explain theories of hydraulics and braking systems.

Objectives	Measures
47.1 Explain principles of fluids.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
47.2 Explain concepts of friction, energy absorption, and heat transfer.	

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Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 48: The learner will diagnose braking system problems.

Objectives	Measures
48.1 Inspect brake lines' condition.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
48.2 Inspect for braking action.	

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Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 49: The learner will adjust, service, repair, and/or replace brake systems and components.

Objectives	Measures
49.1. Perform initial shoe adjustment on drum type self-adjusting brakes.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
49.2 Remove, inspect, service, replace, and adjust drum brake shoes.	
49.3 Remove, inspect, service, and replace a caliper on a disc brake.	
49.4 Remove, service, and replace a hydraulic wheel cylinder.	
49.5 Inspect, service, and/or remove and replace a hydraulic master cylinder.	
49.6 Inspect and replace a power brake assembly.	
49.7 Measure a brake drum using a brake drum micrometer.	
49.8 Measure a disc brake rotor runout using a dial indicator.	
49.9 Resurface a disc brake rotor using a brake drum lathe.	
49.10 Resurface a brake drum using a brake drum lathe.	

Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 49: The learner will adjust, service, repair, and/or replace brake systems and components.

Objectives	Measures
49.11 Fill and bleed a hydraulic brake system using a pressure bleeder.	
49.12 Inspect and adjust a parking brake.	

Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 50: The learner will identify basic types of steering and suspension systems and their components.

Objectives	Measures
50.1 List the basic types of steering and suspension systems.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
50.2 List the components of steering and suspension systems.	

Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 51: The learner will explain steering and suspension geometry.

Objectives	Measures
51.1 Explain steering and suspension geometry.	51.1 Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 52: The learner will diagnose steering and suspension system problems.

	Objectives	Measures
52.1	Inspect tires for wear.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
52.2	Inspect wheels for toe-out on turns, steering, and axis inclination.	
52.3	Inspect an independent front and rear suspension for excessive wear.	
52.4	Remove and replace tires and wheels.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 53: The learner will adjust, remove, repair, and/or replace steering and suspension system components.

Objectives	Measures
53.1 Adjust a steering gear to correct pull using an inch-pound torque wrench.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
53.2 Measure wheel runout.	
53.3 Adjust front wheel caster, camber, and toe-in.	
53.4 Inspect, remove, and replace tie rod ends.	
53.5 Inspect, remove, and replace upper and lower ball joint assemblies.	
53.6 Inspect, remove, and replace upper and lower control arms.	
53.7 Remove and replace coil spring.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 54: The learner will explain the basic types of automatic power transmission systems and components and explain functions.

Objectives	Measures
54.1 Identify the basic components of a clutch system and explain their function.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
54.2 Identify the basic components of a standard transmission and explain their function.	
54.3 Identify the basic components of an automatic transmission system and explain their function.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 55: The learner will explain the theory of manual and hydraulic clutches and automatic transmissions.

Objectives	Measures
55.1 Explain the theory of manual and hydraulic clutches.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
55.2 Explain the theory of automatic transmissions.	

Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 56: The learner will diagnose clutch and transmission system problems.

Objectives	Measures
56.1 Diagnose clutch and transmission systems.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
56.2 Identify two common problems associated with clutch and transmission systems.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 57: The learner will adjust, remove, repair, or replace clutch and transmission components.

Objectives		Measures
57.1	Measure and adjust clutch pedal height and free travel.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
57.2	Remove a standard transmission.	
57.3	Remove and replace a clutch disc and pressure plate assembly.	
57.4	Remove and replace a clutch pilot bearing.	
57.5	Remove, inspect, and replace a clutch release bearing.	
57.6	Remove, inspect, lubricate, and replace a release bearing fork.	
57.7	Measure and adjust clutch slave cylinder free travel.	
57.8	Check fluid level in an automatic transssion and inspect for external oil leaks.	
57.9	Remove and replace rear transmission oil seal.	
57.10	Perform an oil pressure check on an automatic transmission using a pressure gauge.	

Grade Level: 10-12

Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 57: The learner will adjust, remove, repair, or replace clutch and transmission components.

Objectives	Measures
57.11 Adjust transmission bands using an inch-pound torque wrench.	
57.12 Remove, disassemble, clean, inspect, and reassemble a transmission oil pump.	
57.13 Disassemble, inspect, and reassemble a transmission oil pump.	
57.14 Remove, inspect, disassemble, and reassemble a governor assembly.	
57.15 Adjust manual linkage and downshift on an automatic transmission.	
57.16 Remove, inspect, overhaul, and replace a standard transmission.	
57.17 Remove, inspect, overhaul, and replace an automatic transmission.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 58: The learner will identify basic types of automotive differential and rear axle drive systems, their components and explain their functions.

Objectives	Measures
58.1 List the basic types of differentials and rear axle drive systems.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
58.2 Explain the components and functions of differential and rear axle drive systems.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 59: The learner will explain the theories of gears and gearing, differentials, and limited slip drives.

Objectives	Measures
59.1 Explain the theories of gears and slip drives.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
59.2 Explain the theories of differentials.	

Grade Level: 10-12 Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 60: The learner will inspect, measure, adjust, repair, and replace rear axle and differential components.

	Objectives	Measures
60.1	Remove, inspect, repair, and/or replace an universal joint.	Refer to competency Test Item Bank VEC-T&I-C/TB 7391, 7392, 7393.
60.2	Remove and replace a rear axle bearing.	
60.3	Remove, inspect, repair, and replace a constant velocity universal joint.	
60.4	Inspect, test, and balance a drive shaft.	
60.5	Remove and replace a pinion shaft oil seal.	
60.6	Remove, inspect, and replace a rear axle shaft and oil seal.	
60.7	Measure rear axle end play, using a dial indicator.	
60.8	Remove, disassemble, inspect, and reassemble a differential assembly.	
60.9	Measure differential ring gear run-out, using a dial indicator.	
60.10	Check differential tooth contact pattern, using marking compound.	

Grade Level: 10-12

Skills/Subject Area: Auto Mechanics

COMPETENCY GOAL 60: The learner will inspect, measure, adjust, repair, and replace rear axle and differential components.

Objectives	Measures
60.11 Measure and adjust a differential pinion bearing pre-load.	
60.12 Measure and adjust ring gear back-lash using a foot-pound torque wrench.	
60.13 Measure limited slip differential torque using a foot-pound torque wrench.	

Cabinetmaking Outline

1. Orientation

    a. Nature of cabinetmaking
    b. Occupational outlook of the trade

2. Materials

    a. Cabinetmaking materials identification
    b. Cabinetmaking materials selection

3. Planning and Design

    a. Basic cabinetry design
    b. Plans and estimates

4. Tools and Equipment

    a. Basic hand tools and their use
    b. Use of stationary power equipment
    c. Use of portable power tools
    d. Related tools and equipment

5. Safety

    a. Personal safety
    b. General work safety

6. Construction and Installation

    a. Techniques
    b. Installation

7. Fasteners, Adhesives, and Hardware

    a. Installation procedures for fasteners and hardware
    b. Working characteristics of adhesives

8. Finishing

    a. Preparing surfaces
    b. Wood stains
    c. Characteristics of techniques

9. Leadership

    a. Characteristics of a good leader
    b. Importance of parliamentary procedure
    c. Correct use of 17 parliamentary procedures
    d. VICA participation

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Cabinetmaking

COMPETENCY GOAL 1: The learner will understand the nature of the trade of cabinetmaking, and evaluate its potential as a career.

Objectives	Measures
1.1 Recognize terms associated with employment in the cabinetmaking trade.	Refer to competency Test Item Bank VEC-T&I-C/TB 7501, 7502, 7503.
1.2 Identify employment opportunities related to cabinetmaking.	
1.3 Recognize factors which affect the occupational outlook for cabinetmakers.	
1.4 Identify the student requirements for successful participation in the cabinetmaking program.	
1.5 Identify the major skills needed by cabinetmakers.	
1.6 Prepare a personal information sheet.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Cabinetmaking

COMPETENCY GOAL 2: The learner will identify and select basic cabinetmaking materials.

Objectives		Measures
2.1	Describe the structure and physical properties of solid woods.	Refer to competency Test Item Bank VEC-T&I-C/TB 7501, 7502, 7503.
2.2	Identify factors that affect the stability of wood.	
2.3	Identify characteristics of selected softwoods used in cabinetmaking.	
2.4	Identify the characteristics of selected hardwoods used in cabinetmaking.	
2.5	Interpret lumber grading specifications.	
2.6	Describe the physical characteristics of plywood products used in cabinetmaking.	
2.7	Describe the physical characteristics of particle board.	
2.8	Describe the physical characteristics of hardboard.	

Grade Level: 10-12 Skills/Subject Area: Cabinetmaking

COMPETENCY GOAL 3: The learner will describe basic cabinetry design and develop plans and estimates.

Objectives		Measures
3.1	Identify the various styles and designs of cabinetmaking.	Refer to competency Test Item Bank VEC-T&I-C/TB 7501, 7502, 7503.
3.2	Identify the various styles and designs of furniture.	
3.3	Select proper dimensions for various cabinets and related parts.	
3.4	Identify basic cabinetmaking joints.	
3.5	Interpret blueprints.	
3.6	Do basic furniture and cabinetmaking calculations.	
3.7	Calculate costs that are included in a cabinetmaking estimate.	
3.8	Identify factors that determine the quality level of furniture.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Cabinetmaking

COMPETENCY GOAL 4: The learner will identify basic cabinetmaking hand tools and describe their proper use.

Objectives	Measures
4.1 Identify layout and measuring tools used in cabinetmaking.	Refer to competency Test Item Bank VEC-T&I-C/TB 7501, 7502, 7503.
4.2 Describe the proper use of selected layout and measuring tools.	
4.3 Identify sawing tools used in cabinetmaking	
4.4 Describe the proper use of selected sawing tools.	
4.5 Identify edge-cutting tools used in cabinetmaking.	
4.6 Describe the proper use of selected edge-cutting tools.	
4.7 Identify drilling and boring tools used in cabinetmaking.	
4.8 Describe the proper use of selected drilling and boring tools.	
4.9 Identify fastening and assembly tools used in cabinetmaking.	
4.10 Describe the proper use of selected fastening and assembly tools.	
4.11 Demonstrate the use of basic hand tools.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Cabinetmaking

COMPETENCY GOAL 5: The learner will identify and describe the proper use of stationary power equipment used in cabinetmaking.

Objectives	Measures
5.1 Describe the safe and proper use of the radial arm saw.	Refer to competency Test Item Bank VEC-T&I-C/TB 7501, 7502, 7503.
5.2 Describe the safe and proper use of the table saw.	
5.3 Describe the safe and proper use of the jointer.	
5.4 Describe the safe and proper use of the surfacer-planer.	
5.5 Describe the safe and proper use of the drill press.	
5.6 Describe the safe and proper use of the jig saw.	
5.7 Describe the safe and proper use of the band saw.	
5.8 Describe the safe and proper use of the hollow chisel mortiser.	
5.9 Describe the safe and proper use of the wood lathe.	
5.10 Describe the safe and proper use of the shaper.	

Skills/Subject Area: Cabinetmaking

COMPETENCY GOAL 5: The learner will identify and describe the proper use of stationary power equipment used in cabinetmaking.

Objectives	Measures
5.11 Describe the safe and proper use of the stationary power sanders.	
5.12 Demonstrate use of basic power tools.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Cabinetmaking

COMPETENCY GOAL 6: The learner will identify and describe the proper use of portable power tools used in cabinetmaking.

Objectives	Measures
6.1 Describe the safe and proper use of portable power saws.	Refer to competency Test Item Bank VEC-T&I-C/TB 7501, 7502, 7503.
6.2 Describe the safe and proper use of the portable power drills.	
6.3 Describe the safe and proper use of the portable power sanders.	
6.4 Describe the safe and proper use of the router.	

Grade Level: 10-12 Skills/Subject Area: Cabinetmaking

COMPETENCY GOAL 7: The learner will identify and recognize related tools and equipment which will be used in some cabinetmaking jobs.

Objectives	Measures
7.1 Describe the safe and proper use of power nail and staple tools.	Refer to competency Test Item Bank VEC-T&I-C/TB 7501, 7502, 7503.
7.2 Describe the safe and proper use of the tool and chisel grinder.	

Grade Level: 10-12 Skills/Subject Area: Cabinetmaking

COMPETENCY GOAL 8: The learner will identify and explain factors that help assure personal and general work safety in cabinetmaking.

	Objectives	Measures
8.1	Recognize and define terms associated with work safety.	Refer to competency Test Item Bank VEC-T&I-C/TB 7501, 7502, 7503.
8.2	Identify hazards common to the cabinetmaking workplace.	
8.3	Identify safety gear and equipment appropriate for cabinetmaking.	
8.4	Identify rules for general shop safety.	
8.5	Complete a safety checklist.	

Grade Level: 10-12 Skills/Subject Area: Cabinetmaking

COMPETENCY GOAL 9: The learner will describe construction techniques used to produce various cabinet components.

Objectives		Measures
9.1	Describe basic techniques used in constructing cabinetry casework.	Refer to competency Test Item Bank VEC-T&I-C/TB 7501, 7502, 7503.
9.2	Describe basic techniques used in constructing cabinetry doors.	
9.3	Describe basic techniques used in constructing cabinetry drawers.	
9.4	Describe basic techniques used to construct cabinetry legs and rails.	
9.5	Describe basic techniques used to construct cabinet tops.	

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Grade Level: 10-12 Skills/Subject Area: Cabinetmaking

COMPETENCY GOAL 10: The learner will describe procedures necessary for installing various cabinets and components.

Objectives	Measures
10.1 Describe structural features common to kitchen and bath structures.	Refer to competency Test Item Bank VEC-T&I-C/TB 7501, 7502, 7503.
10.2 Describe the steps required to properly install cabinets and built-ins.	
10.3 Describe techniques used in installing paneling.	

Grade Level: 10-12 Skills/Subject Area: Cabinetmaking

COMPETENCY GOAL 11: The learner will identify and describe installation procedures for selected cabinetry fasteners and hardware.

Objectives	Measures
11.1 Identify and describe the proper use of selected nails and staples.	Refer to competency Test Item Bank VEC-T&I-C/TB 7501, 7502, 7503.
11.2 Identify and describe the proper use of selected screws.	
11.3 Identify and describe the proper use of selected cabinetry hardware.	

Grade Level: 10-12 Skills/Subject Area: Cabinetmaking

COMPETENCY GOAL 12: The learner will identify and describe the working characteristics of selected cabinetmaking adhesives.

Objectives	Measures
12.1 Identify the physical characteristics of adhesives frequently used in cabinetmaking.	Refer to competency Test Item Bank VEC-T&I-C/TB 7501, 7502, 7503.
12.2 Identify clamping devices used in cabinetmaking.	
12.3 Select proper adhesives for basic cabinetmaking operations.	

Grade Level: 10-12 Skills/Subject Area: Cabinetmaking

COMPETENCY GOAL 13: The learner will describe the procedures required to prepare surfaces for finishing.

Objectives	Measures
13.1 Describe techniques used for repairing surface damage and blemishes.	Refer to competency Test Item Bank VEC-T&I-C/TB 7501, 7502, 7503.
13.2 Describe techniques used to produce smoothly sanded surfaces.	
13.3 Describe the process of filling open-grain wood.	
13.4 Explain the need for sealing wood.	
13.5 Demonstrate techniques for preparing a surface for finishing.	

Grade Level: 10-12 Skills/Subject Area: Cabinetmaking

COMPETENCY GOAL 14: The learner will select and use wood stains.

Objectives	Measures
14.1 Identify the basic wood stains used in cabinetmaking.	Refer to competency Test Item Bank VEC-T&I-C/TB 7501, 7502, 7503.
14.2 Describe proper staining techniques.	

Grade Level: 10-12 Skills/Subject Area: Cabinetmaking

COMPETENCY GOAL 15: The learner will describe the characteristics of various finishing techniques used in cabinetmaking.

Objectives	Measures
15.1 Identify types of oil finishes.	Refer to competency Test Item Bank VEC-T&I-C/TB 7501, 7502, 7503.
15.2 Describe application practices for using oil finishes.	
15.3 Identify basic types of hard drying finishes.	
15.4 Describe characteristics of various hard drying finishes.	
15.5 Describe basic surface coating techniques using brushes.	
15.6 Describe basic surface coating techniques using spray equipment.	

Grade Level: 10-12 Skills/Subject Area: Cabinetmaking

COMPETENCY GOAL 16: The learner will identify characteristics of a good leader.

Objectives	Measures
16.1 Define "leadership."	Refer to competency Test Item Bank VEC-T&I-C/TB 7501, 7502, 7503.
16.2 Describe characteristics of a good leader.	
16.3 Identify selected leaders within her/his community and list factors that identify each as a leader.	

Grade Level: 10-12 Skills/Subject Area: Cabinetmaking

COMPETENCY GOAL 17: The learner will demonstrate an understanding of the importance of parliamentary procedure.

Objectives	Measures
17.1 Describe the importance of the use of parliamentary procedure.	Refer to competency Test Item Bank VEC-T&I-C/TB 7502, 7502, 7503.
17.2 List in order the items included in the order of business for a meeting.	

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Grade Level: 10-12 Skills/Subject Area: Cabinetmaking

COMPETENCY GOAL 18: The learner will demonstrate knowledge of the correct use of seventeen parliamentary procedures.

Objectives	Measures
18.1 Demonstrate knowledge of the correct use of the following parliamentary procedures: a. main motion b. amend c. previous question d. point of order e. nomination and election f. adjourn	Refer to competency Test Item Bank VEC-T&I-C/TB 7501, 7502, 7503.
18.2 Demonstrate knowledge of the correct use of the following parliamentary procedures: a. appeal from the decision of the chair b. lay on the table c. take from the table d. refer to committee e. parliamentary inquiry	
18.3 Demonstrate knowledge of the correct use of the following parliamentary procedures: a. suspend standing rules b. division of the assembly c. leave to withdraw a motion d. reconsider e. rescind f. call for order of the day	

Grade Level: 10-12 Skills/Subject Area: Cabinetmaking

COMPETENCY GOAL 19: The learner will participate in youth club meetings (VICA).

Objectives	Measures
19.1 Preside over a VICA business meeting.	Refer to competency Test Item Bank VEC-T&I-C/TB 7501, 7502, 7503.
19.2 Preside over a VICA committee meeting.	

Carpentry Outline

1. Hand Tools
    - a. Identification of hand tools
    - b. Use of hand tools
2. Power Tools
    - a. Identification of power tools
    - b. Use of power tools
3. House Plan Interpretation
    - a. Interpret a print
    - b. Bill of material
    - c. Building codes
    - d. Material estimate
4. Building Materials
    - a. Identification of plywoods, hardwoods, softwoods, and nonwood materials
    - b. Grading and classification of plywoods, hardwoods, and softwoods
5. Building Layout
    - a. Leveling
    - b. Instrument identification
6. Footings and Foundations
    - a. Building lines and grade levels
    - b. Footing design and nomenclature
7. Framing
    - a. Types of floor framing
    - b. Types of girders, joist beams, and other support members
    - c. Construction of framing openings
    - d. Wall and ceiling framing
    - e. Principles of roof framing
8. Roofing
    - a. Materials for sloping roofs
    - b. Roofing terminology
    - c. Installation of building paper and asphalt shingles

9. Doors and Windows

    a. Understanding types, sizes, and standards of window construction
    b. Understanding types, sizes, and standards of door construction

10. Finishing

    a. Identification of exterior wall finish
    b. Thermal and sound insulation
    c. Identification of interior wall and ceiling finish
    d. Installation of floor and coverings

11. Stair and Cabinet Construction

    a. Stair construction
    b. Cabinet construction

12. Careers in Carpentry

    a. Opportunities and training
    b. Personal qualifications

13. Leadership

    a. Characteristics
    b. Importance of parliamentary procedure
    c. Correct use of 17 parliamentary procedures
    d. VICA participation

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Carpentry

COMPETENCY GOAL 1: The learner will learn the correct names of basic hand tools.

Objectives	Measures
1.1 Use books and catalogs to identify hand tools.	Refer to competency Test Item Bank VEC-T&I-C/TB 7531, 7532, 7533.
1.2 Match hand tools with a specific task.	

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TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Carpentry

COMPETENCY GOAL 2: The learner will demonstrate the basic use of framing hand tools.

Objectives	Measures
2.1 Demonstrate a basic performance with a specific hand tool.	Refer to competency Test Item Bank VEC-T&I-C/TB 7531, 7532, 7533.
2.2 List the most common hand tools used in framing.	
2.3 Describe the safe and proper use of these tools.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Carpentry

COMPETENCY GOAL 3: The learner will learn the correct names of basic power tools.

Objectives	Measures
3.1 Identify basic power tools from manuals, books, and catalogs.	Refer to competency Test Item Bank VEC-T&I-C/TB 7531, 7532, 7533.
3.2 Describe the safe and proper use of power tools.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Carpentry

COMPETENCY GOAL 4: The learner will demonstrate the basic use of power tools.

Objectives	Measures
4.1 Perform simple operations using power tools.	Refer to competency Test Item Bank VEC-T&I-C/TB 7531, 7532, 7533.
4.2 List the procedures necessary for specific operations requiring hand tools.	

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Grade Level: 10-12 Skills/Subject Area: Carpentry

COMPETENCY GOAL 5: The learner will interpret a blue print.

Objectives	Measures
5.1 Identify correct symbols.	Refer to competency Test Item Bank VEC-T&I-C/TB 7531, 7532, 7533.
5.2 Learn the alphabet of lines.	
5.3 Identify correct dimensions.	
5.4 Identify correct views.	
5.5 Interpret notes, details.	

Grade Level: 10-12 Skills/Subject Area: Carpentry

COMPETENCY GOAL 6: The learner will prepare a bill for materials.

Objectives	Measures
6.1 Identify type, size, and use of construction materials.	Refer to competency Test Item Bank VEC-T&I-C/TB 7531, 7532, 7533.
6.2 Compute math problems relating to square, board, and linear feet.	

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Grade Level: 10-12 Skills/Subject Area: Carpentry

COMPETENCY GOAL 7: The learner will follow building codes applicable to the job.

Objectives	Measures
7.1 Use textbooks and basic building code manuals.	Refer to competency Test Item Bank VEC-T&I-C/TB 7531, 7532, 7533.
7.1 Demonstrate comprehension of codes by passing a written examination.	

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Grade Level: 10-12 Skills/Subject Area: Carpentry

COMPETENCY GOAL 8: The learner will estimate materials for purchase.

Objectives	Measures
8.1 Learn to calculate waste materials by learning percentages of waste from books.	Refer to competency Test Item Bank VEC-T&I-C/TB 7531, 7532, 7533.
8.2 Take a bill of materials and add calculated waste to prepare purchase order.	

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Grade Level: 10-12 Skills/Subject Area: Carpentry

COMPETENCY GOAL 9: The learner will identify common plywoods, hardwoods, softwoods, and other materials.

Objectives	Measures
9.1 Use textbooks and manuals to learn correct nomenclature and characteristics of building materials.	Refer to competency Test Item Bank VEC-T&I-C/TB 7531, 7532,7533.
9.2 Pass identification test on plywoods, hardwoods, and other materials.	

VOCATIONAL EDUCATION
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Grade Level: 10-12   Skills/Subject Area: Carpentry

COMPETENCY GOAL 10: The learner will identify and use nails, screws, and adhesives.

Objectives	Measures
10.1 Secure basic knowledge of fasteners from the carpentry textbook.	Refer to competency Test Item Bank VEC-T&I-C/TB 7531, 7532, 7533.
10.2 Satisfactorily complete a test on fasteners.	

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Grade Level: 10-12 Skills/Subject Area: Carpentry

COMPETENCY GOAL 11: The learner will learn grading and classification of plywoods, hardwoods, and softwoods.

Objectives	Measures
11.1 List the different grades and classifications of plywoods, hardwoods, and softwoods.	Refer to competency Test Item Bank VEC-T&I-C/TB 7531, 7532, 7533.
11.2 Identify the proper application of plywoods, hardwoods, and softwoods.	

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Grade Level: 10-12 Skills/Subject Area: Carpentry

COMPETENCY GOAL 12: The learner will use leveling instruments.

Objectives	Measures
12.1 Identify instruments and their parts by studying pictures and illustrations in the textbook.	Refer to competency Test Item Bank VEC-T&I-C/TB 7531, 7532, 7533.
12.2 Demonstrate comprehension by passing a test on leveling instruments.	

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Grade Level: 10-12 Skills/Subject Area: Carpentry

COMPETENCY GOAL 13: The learner will lay out building lines and grade levels from a foundation plan.

Objectives	Measures
13.1 Use the transit level for setting grade stakes.	Refer to competency Test Item Bank VEC-T&I-C/TB 7531, 7532, 7533.
13.2 Use the 6-8-10 method for checking a right angle.	
13.3 Measure the diagonals of a square or a rectangle, with a tape to check squareness.	
13.4 Set batter boards around layout stakes.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Carpentry

COMPETENCY GOAL 14: The learner will learn footing design and nomenclature.

Objectives	Measures
14.1 Secure descriptions, sizes, and capabilities of footings from textbook.	Refer to competency Test Item Bank VEC-T&I-C/TB 7531, 7532, 7533.
14.2 Sketch several types of footings.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Carpentry

COMPETENCY GOAL 15: The learner will identify types of floor framing.

Objectives	Measures
15.1 Describe and identify platform framing.	Refer to competency Test Item Bank VEC-T&I-C/TB 7531, 7532, 7533.
15.2 Construct a freehand sketch of platform framing and label each part.	
15.3 Describe and identify ballon framing.	
15.4 Compare ballon framing to floor framing and list the advantages and disadvantages of each.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Carpentry

COMPETENCY GOAL 16: The learner will identify types of girders, joists, beams, and other support members.

Objectives	Measures
16.1 Use the textbook to identify and learn types of girders, joists, beams, and other support members.	Refer to compentency Test Item Bank VEC-T&I-C/TB 7531, 7532, 7533.
16.2 Identify the proper application of girders, joists, beams, and support members.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Carpentry

COMPETENCY GOAL 17: The learner will construct stairwells, chimneys and other framing openings.

Objectives	Measures
17.1 Identify and learn how to construct stairways and other framing openings from studying the textbook and taking field trips whenever a live project is not available.	Refer to competency Test Item Bank VEC-T&I-C/TB 7531, 7532, 7533.
17.2 Identify correct procedures for framing an opening.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Carpentry

COMPETENCY GOAL 18: The learner will identify, lay out, cut, and install wall and ceiling framing.

Objectives	Measures
18.1 Use the textbook to secure nomenclature and installation procedures for wall and ceiling framing.	Refer to competency Test Item Bank VEC-T&I-C/TB 7531, 7532, 7533.
18.2 Obtain lay out, cutting, and installation skills for wall and ceiling framing from a live project or scale models.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Carpentry

COMPETENCY GOAL 19: The learner will learn principles of various types of roof framing.

Objectives	Measures
19.1 Identify various roof shapes.	Refer to competency Test Item Bank VEC-T&I-C/TB 7531, 7532, 7533.
19.2 Construct a drawing, showing a plan view of a roof frame, and label its various kinds of rafters.	
19.3 Use a framing square to layout rafter for correct pitch.	
19.4 Study textbook illustrations to learn the parts of a rafter, truss, and basic terms used in rafter layout.	

Grade Level: 10-12 Skills/Subject Area: Carpentry

COMPETENCY GOAL 20: The learner will describe roofing materials used for sloping roofs such as asphalt, wood, mineral fiber shingles, slate, and tile.

Objectives	Measures
20.1 Describe common roofing materials.	Refer to competency Test Item Bank VEC-T&I-C/TB 7531, 7532, 7533.
20.2 Identify the advantages and disadvantages of different roofing materials.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Carpentry

COMPETENCY GOAL 21: The learner will learn roofing terminology such as slope, pitch, square, coverage, exposure, lap, and butt.

Objectives	Measures
21.1 Develop a glossary of roofing terms.	Refer to competency Test Item Bank VEC-T&I-C/TB 7531, 7532, 7533.
21.2 List the three most common types of roofs.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Carpentry

COMPETENCY GOAL 22: The learner will acquire skills by installing building paper and asphalt shingles on a small building.

Objectives	Measures
22.1 Demonstrate the ability to install asphalt shingles.	Refer to competency Test Item Bank VEC-T&I-C/TB 7531, 7532, 7533.
22.2 List the proper safety procedures to be used when roofing.	

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TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Carpentry

COMPETENCY GOAL 23: The learner will secure a basic understanding of the various types, sizes, and standards of window and door construction.

Objectives	Measures
23.1 Analyze various examples of doors and windows that may be available in order to recognize standards of quality and construction.	Refer to competency Test Item Bank VEC-T&I-C/TB 7531, 7532, 7533.
23.2 Explain what makes a door or window functional.	
23.3 Learn construction terminology relating to opening size and drawing details.	
23.4 Recognize quality in materials, fittings, weather strippings, and finish moldings.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Carpentry

COMPETENCY GOAL 24: The learner will be able to identify and apply exterior wall finish.

Objectives	Measures
24.1 Use the textbook for identification and construction principles.	Refer to competency Test Item Bank VEC-T&I-C/TB 7531, 7532, 7533.
24.2 Participate in a live project where possible in order to develop skills of finishing application.	
24.3 Explain wall and cornice details, trim boards, wall coverings, and trim members around doors and windows.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Carpentry

COMPETENCY GOAL 25: The learner will understand that cover insulation materials; barriers designed to prevent heat loss, reduce sound intensity and transmission, and contain vapor; and, those constructed to facilitate ventilation, form the basic features of proper thermal and sound insulation.

Objectives	Measures
25.1 Develop a basic understanding of thermal and sound insulation.	Refer to competency Test Item Bank VEC-T&I-C/TB 7531, 7532, 7533.
25.2 Show comprehension by passing a test on thermal and sound insulation.	

Grade Level: 10-12 Skills/Subject Area: Carpentry

COMPETENCY GOAL 26: The learner will develop a basic understanding of interior wall and ceiling finishes.

Objectives	Measures
26.1 Identify the different types of interior wall and ceiling coverings with the necessary joints, fasteners, and adhesives.	Refer to competency Test Item Bank VEC-T&I-C/TB 7531, 7532, 7533.
26.2 Demonstrate comprehension of interior wall and ceiling finishes.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Carpentry

COMPETENCY GOAL 27: The learner will obtain a basic knowledge of the types of, and installation procedures for, laying down floors and coverings.

Objectives	Measures
27.1 Learn floor types and installation procedures.	Refer to competency Test Item Bank VEC-T&I-C/TB 7531, 7532, 7533.
27.2 Install or describe floor installation procedures.	

Grade Level: 10-12 Skills/Subject Area: Carpentry

COMPETENCY GOAL 28: The learner will construct a simple set of stairs.

Objectives	Measures
28.1 Identify stair components. 28.2 Use a framing square to lay out a simple set of steps.	Refer to competency Test Item Bank VEC-T&I-C/TB 7531, 7532, 7533.

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Carpentry

COMPETENCY GOAL 29: The learner will develop basic skills in, and an understanding of, cabinet construction and installation.

Objectives	Measures
29.1 Construct a simple cabinet with appropriate hardware.	Refer to competency Test Item Bank VEC-T&I-C/TB 7531, 7532, 7533.
29.2 Know standard cabinet materials and dimensions.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Carpentry

COMPETENCY GOAL 30: The learner will become acquainted with the personal qualifications, skills and training required by, and the apprenticeships and opportunities available in a career as a carpenter.

Objectives	Measures
30.1 View career survey films.	Refer to competency Test Item Bank VEC-T&I-C/TB 7531, 7532, 7533.
30.2 Listen to guest speakers such as a carpenter or contractor.	
30.3 Study career information literature.	

Cosmetology Outline

1. Work Habits and General Competencies

    a. Oral and written instructions
    b. Work habits and behavior
    c. Positive attitude towards safety
    d. Communicating ideas
    e. Occupational opportunities and requirements

2. Terminology, Organization, and Technical Knowledge

    a. State laws, history, and regulations
    b. Lab safety procedures
    c. Sterilization, sanitation, bacteriology, and first aid processes
    d. Proper attitude and personality
    e. Related cosmetology professions

3. Scalp and Hair Care

    a. Analyzing scalp and hair
    b. Scientific brushing
    c. Correct shampooing skills
    d. Application of hair rinses and conditioners

4. Hair Styling

    a. Basic wet hairstyling techniques
    b. Proper pressing and thermal curling techniques

5. Facial Shapes and Profiles

    a. Body structure
    b. Hairstyling skills for body structure

6. Hair Cutting and Shaping

    a. Haircutting shapes and implements
    b. Demonstrate haircut and shaping

7. Wiggery

    a. Fibers and construction
    b. Styling and cleaning

8. Permanent Waving

    a. Products and implements
    b. Analyzation

9. Chemical Relaxing

    a. Hair relaxing products
    b. Analyzing hair

10. Hair Coloring and Lightening

    a. Products for coloring, lightening, and conditioning tint-backs
    b. Coloring hair by temporary, semipermanent, and permanent methods

11. Manicuring and Pedicuring

    a. Nail diseases and disorders
    b. Proper tools and supplies

12. Facials and Make-up

    a. Facial treatments
    b. Proper skills for facial procedures

13. Salon Planning and Management

    a. Site selection
    b. Layout of salon
    c. Taxes and laws

14. Leadership

    a. Characteristics
    b. Importance of parliamentary procedure
    c. Correct use of 17 parliamentary procedures
    d. VICA participation

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Cosmetology

COMPETENCY GOAL 1: The learner will follow oral or written instructions for performing job tasks.

Objectives	Measures
1.1 Read written instructions and/or specifications accurately.	Refer to competency Test Item Bank VEC-T&I-C/TB 7691, 7692, 7693.
1.2 Complete tasks as directed.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Cosmetology

COMPETENCY GOAL 2: The learner will demonstrate acceptable work habits and behavior.

Objectives	Measures
2.1 Explain shop procedures and practices.	Refer to competency Test Item Bank VEC-T&I-C/TB 7691, 7692, 7693.
2.2 Work cooperatively with fellow students and supervisors.	
2.3 Handle materials, tools, and equipment in a responsible manner.	
2.4 Maintain work area in an acceptable manner.	
2.5 Maintain appropriate personal hygiene and appearance.	
2.6 Perform work of consistently good quality.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Cosmetology

COMPETENCY GOAL 3: The learner will demonstrate a positive attitude towards safety.

Objectives	Measures
3.1 Explain shop rules related to safety.	Refer to competency Test Item Bank VEC-T&I-C/TB 7691, 7692, 7693.
3.2 Follow prescribed safety procedures in performing job tasks.	
3.3 Wear appropriate personal protective equipment consistently.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Cosmetology

COMPETENCY GOAL 4: The learner will communicate ideas effectively to individual and to groups.

Objectives	Measures
4.1 List the elements of a prepared speech.	Refer to competency Test Item Bank VEC-T&I-C/TB 7691, 7692, 7693.
4.2 Make a prepared speech.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12   Skills/Subject Area: Cosmetology

COMPETENCY GOAL 5: The learner will describe cosmetology occupational opportunities and requirements.

Objectives	Measures
5.1 Describe the types of occupational opportunities and related fields.	Refer to competency Test Item Bank VEC-T&I-C/TB 7691, 7692, 7693.
5.2 Describe cosmetology shop operating procedures and practices.	
5.3 Interpret the relationship between worker productivity and consumer prices in a free enterprise systems.	

Grade Level: 10-12 Skills/Subject Area: Cosmetology

COMPETENCY GOAL 6: The learner will identify state laws, history, rules, and regulations relating to the cosmetology profession.

Objectives	Measures
6.1 Demonstrate knowledge and practice of rules and regulations.	Refer to competency Test Item Bank VEC-T&I-C/TB 7691, 7692, 7693.
6.2 Describe governing agencies.	
6.3 Document time and describe procedure for record-keeping.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Cosmetology

COMPETENCY GOAL 7: The learner will demonstrate lab safety procedures.

Objectives	Measures
7.1 List the hazardous equipment used in the lab.	Refer to competency Test Item Bank VEC-T&I-C/TB 7691, 7692, 7693.
7.2 Explain the safe and proper use of the equipment.	

Grade Level: 10-12 Skills/Subject Area: Cosmetology

COMPETENCY GOAL 8: The learner will demonstrate sterilization, sanitation, bacteriology, and first aid processes.

Objectives	Measures
8.1 List the processes used in sterilization, sanitation, bacteriology, and first aid.	Refer to competency Test Item Bank VEC-T&I-C/TB 7691, 7692, 7693.
8.2 Demonstrate the processes used in sterilization, sanitation, bacteriology, and first aid.	

Grade Level: 10-12 Skills/Subject Area: Cosmetology

COMPETENCY GOAL 9: The learner will demonstrate proper attitude and personality traits of the cosmetologist.

Objectives	Measures
9.1 List six characteristics of a good cosmetologist.	Refer to competency Test Item Bank VEC-T&I-C/TB 7691, 7692, 7693.
9.2 Compare and contrast good public relations techniques.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Cosmetology

COMPETENCY GOAL 10: The learner will identify related cosmetology professions.

Objectives	Measures
10.1 Identify and list related cosmetology professions.	Refer to competency Test Item Bank VEC-T&I-C/TB 7691, 7692, 7693.
10.2 Discuss the different types of related professions.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Cosmetology

COMPETENCY GOAL 11: The learner will analyze the condition of scalp and hair.

Objectives	Measures
11.1 Demonstrate proper skills for prescribing shampoos.	Refer to competency Test Item Bank VEC-T&I-C/TB 7691, 7692, 7693.
11.2 Demonstrate proper skills for prescribing treatment of hair and scalp disorders.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Cosmetology

COMPETENCY GOAL 12: The learner will demonstrate scientific brushing.

Objectives	Measures
12.1 List the elements involved in scientific brushing.	Refer to competency Test Item Bank VEC-T&I-C/TB 7691, 7692, 7693.
12.2 Demonstrate scientific brushing.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Cosmetology

COMPETENCY GOAL 13: The learner will demonstrate correct shampooing skills.

Objectives	Measures
13.1 List the procedures for correct shampooing.	Refer to competency Test Item Bank VEC-T&I-C/TB 7691, 7692, 7693.
13.2 Demonstrate correct shampooing skills.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Cosmetology

COMPETENCY GOAL 14: The learner will demonstrate skills for application of hair rinses and conditioners.

Objectives	Measures
14.1 Identify the procedures for applying hair rinses and conditioners.	Refer to competency Test Item Bank VEC-T&I-C/TB 7691, 7692, 7693.
14.2 Demonstrate skills for applying hair rinses and conditioners.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Cosmetology

COMPETENCY GOAL 15: The learner will demonstrate basic wet hairstyling techniques.

Objectives	Measures
15.1 Demonstrate fingerwaving/molding and scaling or sectioning procedures.	Refer to competency Test Item Bank VEC-T&I-C/TB 7691, 7692, 7693.
15.2 Demonstrate different types of pincurls.	
15.3 Demonstrate roller techniques showing volume and indentation.	
15.4 Demonstrate a basic combout. a. relaxing b. dry molding c. back combing d. execution e. ornamentation	

Grade Level: 10-12 Skills/Subject Area: Cosmetology

COMPETENCY GOAL 16: The learner will demonstrate proper pressing and thermal curling techniques.

Objectives	Measures
16.1 Demonstrate blow drying and thermal curling techniques.	Refer to competency Test Item Bank VEC-T&I-C/TB 7691, 7692, 7693.
16.2 Demonstrate dry hairstyling techniques.	

Grade Level: 10-12 Skills/Subject Area: Cosmetology

COMPETENCY GOAL 17: The learner will identify body structures.

Objectives	Measures
17.1 Identify facial shapes and facial profiles.	Refer to competency Test Item Bank VEC-T&I-C/TB 7691, 7692, 7693.
17.2 Demonstrate hairstyling skills for various body structures and face shapes.	

Grade Level: 10-12 Skills/Subject Area: Cosmetology

COMPETENCY GOAL 18: The learner will identify haircutting and shaping implements, describe various types of hair cuts, and demonstrate the ability to give a haircut and shaping.

Objectives		Measures
18.1	Demonstrate skills in the use of haircutting implements.	Refer to competency Test Item Bank VEC-T&I-C/TB 7691, 7692, 7693.
18.2	Demonstrate sectioning techniques for a haircut.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Cosmetology

COMPETENCY GOAL 19: The learner will identify fibers and construction used in wiggery and demonstrate skills in styling and cleaning wigs.

Objectives	Measures
19.1 List the fibers and construction techniques used in wiggery.	Refer to competency Test Item Bank VEC-T&I-C/TB 7691, 7692, 7693.
19.2 Demonstrate skills used in styling and cleaning wiggery.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Cosmetology

COMPETENCY GOAL 20: The learner will identify permanent wave products and implements, analyze hair, and demonstrate the ability to give a permanent wave.

Objectives	Measures
20.1 Demonstrate knowledge of the history of permanent waving.	Refer to competency Test Item Bank VEC-T&I-C/TB 7691, 7692, 7693.
20.2 Demonstrate knowledge of the chemistry of permanent waving.	
20.3 Demonstrate knowledge and skills of permanent waving methods.	
20.4 Demonstrate knowledge and skill of permanent waving procedures.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Cosmetology

COMPETENCY GOAL 21: The learner will identify chemical hair relaxing products, analyze hair, and demonstrate the ability to give a chemical relaxer.

Objectives	Measures
21.1 Understand the chemistry of hair relaxers.	Refer to competency Test Item Bank VEC-T&I-C/TB 7691, 7692, 7693.
21.2 Demonstrate safety procedures.	
21.3 Demonstrate the ability to give a chemical waxing treatment.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Cosmetology

COMPETENCY GOAL 22: The learner will identify products for coloring, lightening, conditioning tint backs, lash and brow tints, and demonstrate ability to color hair by temporary, semipermanent, and permanent methods.

Objectives	Measures
22.1 Demonstrate skills in use of hair coloring and lightening products.	Refer to competency Test Item Bank VEC-T&I-C/TB 7691, 7692, 7693.
22.2 Demonstrate safety procedures in hair coloring and lightening products.	

Grade Level: 10-12 Skills/Subject Area: Cosmetology

COMPETENCY GOAL 23: The learner will identify nail diseases and disorders and demonstrate the ability to give a manicure and pedicure using proper tools and supplies.

Objectives	Measures
23.1 Identify nail structure.	Refer to competency Test Item Bank VEC-T&I-C/TB 7691, 7692, 7693.
23.2 Identify nail disorders.	
23.3 Demonstrate manicuring and pedicuring procedures.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Cosmetology

COMPETENCY GOAL 24: The learner will identify facial treatments and demonstrate the ability to give a facial.

Objectives	Measures
24.1 Identify and analyze skin condition.	Refer to competency Test Item Bank VEC-T&I-C/TB 7691, 7692, 7693.
24.2 Demonstrate the proper skills for facial procedures.	
24.3 Demonstrate knowledge of makeup and skill in its application.	
24.4 Demonstrate skill in removal of superfluous hair.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Cosmetology

COMPETENCY GOAL 25: The learner will be able to select a potential location for, and design the physical lay out of, a salon, and know about the taxes and laws relating to the operation of a salon.

Objectives	Measures
25.1 List the elements of starting a business.	Refer to competency Test Item Bank VEC-T&I-C/TB 7691, 7692, 7693.
25.2 Discuss taxes and laws pertaining to salons.	

Grade Level: 10-12 Skills/Subject Area: Cosmetology

COMPETENCY GOAL 26: The learner will develop leadership skills through participation in VICA activities.

Objectives	Measures
26.1 Participate actively in the leadership skills of the Vocational Industrial Clubs of America.	Refer to competency Test Item Bank VEC-T&I-C/TB 7691, 7692, 7693.

Diesel Mechanics Outline

1. Orientation
   - a. Occupational outlook
   - b. Place of employment
   - c. Task in diesel workshop

2. Shop Safety
   - a. Select terms associated with shop safety
   - b. Safety rules
   - c. Shop rules and regulations
   - d. Classes of fire
   - e. Types of fire extinguishers

3. Basic Shop Tools
   - a. Identify types of hammers
   - b. Identify types of pliers
   - c. Identify types of wrenches
   - d. Identify types of cold chisels
   - e. Identify types of punches
   - f. Identify types of files
   - g. Identify types of pullers
   - h. Identify types of feeler gauges
   - i. Identify types of micrometers

4. Introduction to Test Equipment and Service Tools
   - a. Identify test equipment and service tools
   - b. List uses of test equipment and service tools

5. Fasteners
   - a. List and describe qualities of typical fasteners
   - b. Identify typical belthead styles
   - c. Identify typical nuts
   - d. Identify methods for removing and placing nuts and bolts

6. Engine Operating Principles
   - a. Identify terms associated with engine operations principles
   - b. Identify basic parts of a diesel engine
   - c. Describe two and four stroke engines

7. Diesel Fuels

   a. Combustion cycle
   b. Crude oil by-products
   c. Types of diesel exhaust smoke
   d. Rules for storage of diesel fuels

8. Engine Lubricants

   a. Discuss engine oil and oil additives
   b. List oil ratings and classifications
   c. Rules for selection of oil and oil additives

9. Bearings

   a. Types of bearings
   b. Function of bearings
   c. Lead forces
   d. Properties of bearings
   e. Bearing failure

10. Seals

   a. Types and locations of seals
   b. Seal failure

11. Cylinder Head Assembly

   a. Major parts
   b. List terms associated with cylinder assembly
   c. Valve assembly
   d. Valve arrangement
   e. Cylinder head disassembly and reassembly

12. Piston and Connecting Rod Assemblies

   a. Piston
   b. Connecting rods
   c. Rings

13. Camshafts, Gears Train, and Engine Timing

   a. List terms associated with camshafts and gears
   b. Discuss methods of removal and replacement of camshafts and gears

14. Frames and Cylinder Blocks

   a. Typical frame design
   b. Through-bolts on A-frame design engine

15. Cooling System

    a. List functions of cooling system
    b. Identify component parts of the cooling system

16. Air Intake and Exhaust System

    a. List parts of air intake system
    b. List parts of exhaust system

17. Starting System

    a. List functions of the fuel injection system
    b. List major parts of the fuel injection system

18. Leadership Development

    a. Characteristics of a good leader
    b. Parliamentary procedure
    c. VICA participation

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Diesel Mechanics

COMPETENCY GOAL 1: The learner will discuss facts concerning the occupational outlook, places of employment, and steps involved in diesel mechanics.

Objectives	Measures
1.1 List facts concerning the occupational outlook for diesel mechanics.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7451, 7452, 7453.
1.2 Identify places that employ diesel mechanics.	
1.3 Identify steps involved in applying for work in a diesel workshop.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Diesel Mechanics

COMPETENCY GOAL 2: The learner will discuss general shop and personal safety rules, describe unsafe shop situations, and choose correct fire extinguishers.

Objectives		Measures
2.1	Select terms associated with shop safety.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7451, 7452, 7453.
2.2	List personal safety rules.	
2.3	List general shop safety rules.	
2.4	Identify four classes of fires.	
2.5	Identify type or types of fire extinguishers used on the four fire classes.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Diesel Mechanics

COMPETENCY GOAL 3: The learner will discuss the basic shop tools and their correct use.

Objectives	Measures
3.1 Identify types of screwdrivers.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7451, 7452, 7453.
3.2 Identify types of hammers.	
3.3 Identify types of pliers.	
3.4 Identify types of wrenches.	
3.5 Identify types of cold chisels	
3.6 Identify types of punches.	
3.7 Identify types of files.	
3.8 Identify types of pullers.	
3.9 Identify types of feeler gauges.	
3.10 Identify types of micrometers.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Diesel Mechanics

COMPETENCY GOAL 4: The learner will be able to accurately read micrometers.

Objectives		Measures
4.1	Measure pistons for excessive wear.	Refer Too Competency Test Item Bank VEC-T&I-C/TB 7451, 7452, 7453.
4.2	Measure crankshaft for excessive wear.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Diesel Mechanics

COMPETENCY GOAL 5: The learner will identify testing equipment and service tools.

Objectives		Measures
5.1	List terms associated with test equipment and service tools.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7451, 7452, 7453.
5.2	Identify types of testing equipment.	
5.3	Identify types of servicing tools.	
5.4	Describe the testing equipment's correct functions.	
5.5	Describe the servicing tools' correct functions.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Diesel Mechanics

COMPETENCY GOAL 6: The learner will identify typical fasteners and describe qualities of a satisfactory fastener.

Objectives	Measures
6.1 List terms associated with fasteners.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7451, 7452, 7453.
6.2 Identify typical fasteners.	
6.3 Identify typical bolt head styles.	
6.4 Identify typical nuts.	
6.5 List qualities of a satisfactory fastener.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Diesel Mechanics

COMPETENCY GOAL 7: The learner will identify methods used to remove seized bolts and nuts, and the tools used to restore threads.

Objectives	Measures
7.1 List methods used to remove seized bolts and nuts.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7451, 7452, 7453.
7.2 List tools used to restore threads.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Diesel Mechanics

COMPETENCY GOAL 8: The learner will explain diesel engine operating principles.

Objectives		Measures
8.1	Identify terms associated with diesel engine operating principles.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7451, 7452, 7453.
8.2	Describe the operation of the diesel engine.	
8.3	Identify basic parts of a diesel engine.	
8.4	Describe basic engine parts and their functions.	
8.5	Describe the four- and two-stroke cycle.	
8.6	Tell what happens during each stroke.	
8.7	Tell the basic difference between a two-stroke and four-stroke cycle engine.	

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TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Diesel Mechanics

COMPETENCY GOAL 9: The learner will discuss the characteristics of high cetane fuels, and arrange in order the operating principles that describe the diesel fuel combustion cycle.

Objectives		Measures
9.1	Discuss terms associated with diesel fuels.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7451, 7452, 7453.
9.2	Describe the diesel fuel combustion cycle.	
9.3	List crude oil by-products.	
9.4	List the most likely causes of black smoke from diesel exhaust.	
9.5	List the most likely causes of white smoke from diesel exhaust.	

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Grade Level: 10-12 Skills/Subject Area: Diesel Mechanics

COMPETENCY GOAL 10: The learner will discuss important considerations when storing diesel fuel and select methods used to protect fuel quality.

Objectives	Measures
10.1 List important considerations when storing diesel fuel.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7451, 7452, 7453.
10.2 List methods and rules used to protect fuel quality.	

Grade Level: 10-12 Skills/Subject Area: Diesel Mechanics

COMPETENCY GOAL 11: The learner will discuss the functions of engine oils and oil additives.

Objectives	Measures
11.1 Discuss terms associated with lubricants.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7451, 7452, 7453.
11.2 List the functions of engine oils.	
11.3 Select the characteristics of a good engine oil.	
11.4 Discuss oil ratings and classifications.	
11.5 List general rules for selection and use of lubricants for best engine performance.	
11.6 Discuss ways to avoid oil contamination.	

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Grade Level: 10-12 Skills/Subject Area: Diesel Mechanics

COMPETENCY GOAL 12: The learner will discuss terms associated with the cooling system, types of cooling systems, parts of the cooling system, and types of antifreeze.

Objectives	Measures
12.1 Discuss terms associated with the cooling system.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7451, 7452, 7453.
12.2 Identify basic parts of the cooling system.	
12.3 List advantages and disadvantages of a liquid cooling system.	
12.4 List requirements of a good antifreeze.	
12.5 List preventive maintenance procedures in maintaining a cooling system.	

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Grade Level: 10-12 Skills/Subject Area: Diesel Mechanics

COMPETENCY GOAL 13: The learner will explain types of bearings, their functions, factors influencing distribution of lubricant, and causes of bearing failure.

Objectives		Measures
13.1	Discuss terms associated with bearings.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7451, 7452, 7453.
13.2	Discuss the functions of bearings.	
13.3	Discuss load forces on bearings.	
13.4	Describe the advantages and disadvantages of different types of bearings.	
13.5	List materials from which bearings are constructed.	
13.6	List factors influencing the distribution of lubricants to the bearing.	
13.7	List causes of bearing failure.	
13.8	List reasons for bearing crush.	
13.9	List different types of bearings.	

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Grade Level: 10-12 Skills/Subject Area: Diesel Mechanics

COMPETENCY GOAL 14: The learner will discuss terms associated with seals, types of seals, their functions, and locations where seals might be used.

Objectives	Measures
14.1 Discuss terms associated with seals.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7451, 7452, 7453.
14.2 List uses of seals.	
14.3 List basic types of seals.	
14.4 List places where seals are used.	

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Grade Level: 10-12 Skills/Subject Area: Diesel Mechanics

COMPETENCY GOAL 15: The learner will discuss major parts found in a cylinder head assembly.

Objectives	Measures
15.1 Discuss terms associated with the cylinder head assembly.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7451, 7452, 7453.
15.2 Identify major components of a cylinder head assembly.	
15.3 Identify forms of cylinder head castings.	

Grade Level: 10-12 Skills/Subject Area: Diesel Mechanics

COMPETENCY GOAL 16: The learner will explain primary parts of a valve assembly, types of valve rotators, valve arrangements, and forms of engine valves.

Objectives	Measures
16.1 Identify the primary parts of a valve assembly.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7451, 7452, 7453.
16.2 List types of valve rotators.	
16.3 Identify the different types of valve arrangements.	
16.4 Identify forms of engine valves.	

Grade Level: 10-12 Skills/Subject Area: Diesel Mechanics

COMPETENCY GOAL 17: The learner will explain procedures for cylinder head disassembly.

Objectives	Measures
17.1 Disassemble a cylinder.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7451, 7452, 7453.
17.2 List the parts of the cylinder assembly.	

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Grade Level: 10-12 Skills/Subject Area: Diesel Mechanics

COMPETENCY GOAL 18: The learner will discuss terms associated with the piston and connecting rod, and explain the function of the piston and connecting rod assemblies.

Objectives	Measures
18.1 Discuss terms associated with the piston and connecting rod assemblies.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7451, 7452, 7453.
18.2 Identify primary parts of a piston and connecting rod assembly.	
18.3 List the functions of the piston.	
18.4 Identify the major parts of a piston.	
18.5 List the common types of rings.	
18.6 List the types of piston pins.	
18.7 Identify types of construction for connecting rod assembly.	
18.8 Explain the reason for markings on the connecting rod.	

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Grade Level: 10-12 Skills/Subject Area: Diesel Mechanics

COMPETENCY GOAL 19: The learner will discuss terms associated with the camshaft, gears, and parts actuated by the camshaft.

Objectives	Measures
19.1 Identify primary parts of the camshaft and parts actuated by the camshaft.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7451, 7452, 7453.
19.2 Identify typical gears found in a gear train.	
19.3 Explain valve timing.	

Grade Level: 10-12 Skills/Subject Area: Diesel Mechanics

COMPETENCY GOAL 20: The learner will list stationary parts of a typical frame design.

Objectives	Measures
20.1 Describe the purpose of through-bolts on an A-frame design engine.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7451, 7452, 7453.
20.2 List ways that cylinder blocks are constructed.	

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Grade Level: 10-12 Skills/Subject Area: Diesel Mechanics

COMPETENCY GOAL 21: The learner will discuss terms associated with the crankshaft bearings, types of crankshaft construction, parts of the crankshaft, ways the crankshaft is balanced, and the effect of crankshaft throws.

Objectives	Measures
21.1 Identify major parts of the crankshaft.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7451, 7452, 7453.
21.2 List ways the crankshaft is balanced.	
21.3 Explain crankshaft throws.	

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Grade Level: 10-12　　Skills/Subject Area: Diesel Mechanics

COMPETENCY GOAL 22: The learner will discuss the functions, types, and components of the lubrication system.

Objectives	Measures
22.1 List the function of the lubrication system.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7451, 7452, 7453.
22.2 List the types of lubrication systems.	
22.3 Identify the components of the lubrication system.	

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Grade Level: 10-12 Skills/Subject Area: Diesel Mechanics

COMPETENCY GOAL 23: The learner will discuss the functions, components, and effect the cooling system has on engine performance.

Objectives	Measures
23.1 List the functions of the cooling system.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7451, 7452, 7453.
23.2 Identify all components of the cooling system.	
23.3 List the effects of the engine running too hot or too cold.	

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Grade Level: 10-12 Skills/Subject Area: Diesel Mechanics

COMPETENCY GOAL 24: The learner will discuss the functions and components of the air intake and exhaust systems.

Objectives	Measures
24.1 List parts of the air intake system.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7451, 7452, 7453.
24.2 List parts of the exhaust system.	

Grade Level: 10-12 Skills/Subject Area: Diesel Mechanics

COMPETENCY GOAL 25: The learner will explain the various methods used to start diesel engines and the components necessary to operate the starting system.

Objectives	Measures
25.1 List various sources used to start a diesel engine.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7451, 7452, 7453.
25.2 Identify components necessary to start a diesel engine.	

Grade Level: 10-12 Skills/Subject Area: Diesel Mechanics

COMPETENCY GOAL 26: The learner will select major functions of the fuel injection system and explain the operation of the jerk pump.

Objectives	Measures
26.1 List major parts of the fuel injection system.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7451, 7452, 7453.
26.2 Explain the jerk pump system.	

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Grade Level: 10-12 Skills/Subject Area: Diesel Mechanics

COMPETENCY GOAL 27: The learner will identify characteristics of a good leader.

Objectives	Measures
27.1 Define "leadership."	**Refer to Competency Test Item Bank VEC-T&I-C/TB 7451, 7452, 7453.**
27.2 Name characteristics of a good leader.	
27.3 Identify selected leaders within the community, and list three factors that identify each as a leader.	

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Grade Level: 10-12 Skills/Subject Area: Diesel Mechanics

COMPETENCY GOAL 28: The learner will demonstrate an understanding of parliamentary procedure.

Objectives	Measures
28.1 Describe the importance and use of parliamentary procedure.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7451, 7452, 7453.
28.2 List the items of a business agenda.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Diesel Mechanics

COMPETENCY GOAL 29: The learner will correctly perform seventeen steps of parliamentary procedure.

Objectives	Measures
29.1 **Demonstrate the following parliamentary procedure abilities: main motion, amend, previous question, point of order, nominations and elections, and adjourn.**	Refer to Competency Test Item Bank VEC-T&I-C/TB 7451, 7452, 7453
29.2 **Demonstrate the following parliamentary procedure abilities: appeal from decision of the chair, lay on the table, take from the table, refer to committee, and parliamentary inquiry.**	
29.3 **Demonstrate the following parliamentary procedure abilities: suspend standing rules, division of assembly, leave to withdraw a motion, reconsider, rescind, and call for orders of the day.**	

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Grade Level: 10-12 Skills/Subject Area: Diesel Mechanics

COMPETENCY GOAL 30: The learner will participate in a youth club meeting (VICA).

Objectives	Measures
30.1 Preside over a VICA business meeting.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7451, 7452, 7453.
30.2 Preside over a VICA committee meeting.	

Electrical Trades Outline

1. Safety

    a. Identify safe work habits
    b. Practice safe work habits

2. Personal Development

    a. Develop attributes
    b. Pursue VICA achievement degree

3. Electrical Tools

    a. Tool identification
    b. Use of tools

4. Electrical Fundamentals

    a. Terms used in electrical trades
    b. Ohm's Law
    c. Electrical measurements

5. Electrical Circuits

    a. DC resistive circuits
    b. AC resistive circuits
    c. Reactive circuits
    d. Polyphase systems

6. Magnetism

    a. Magnetic Law (Lenz)
    b. Electromechanical EM devices

7. Motors and Generators

    a. Principles of electric motors and generators
    b. Motor controls

8. Electrical Appliances

    a. Scope of appliance repair field
    b. Electrical devices
    c. Appliance servicing techniques

9. Electrical Blueprint Reading

   a. Conventional and electrical building plan symbols
   b. Electrical requirements for building plans
   c. Layout and sketch of electrical circuits

10. National Electrical Code (NEC)

   a. Purpose and developer of the NEC
   b. Electrical wiring requirements
   c. Electrical requirement analysis

11. Residential Wiring

   a. Plans for electrical requirements
   b. Electrical loads
   c. Branch circuits and feeder service
   d. Typical installation estimate
   e. Residential electrical installation

12. Commercial Installations

   a. NEC special requirements
   b. Motor loaded branch circuit

13. Industrial Installations

   a. NEC special requirements
   b. Branch load raceway size

14. Low Voltage Installations

   a. Low voltage conditions
   b. Low voltage circuit installation

15. Leadership

   a. Characteristics
   b. Importance of parliamentary procedure
   c. Correct use of 17 parliamentary procedures
   d. VICA participation

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Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 1: The learner will identify safe work habits.

Objectives		Measures
1.1	Identify safety precautions.	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
1.2	Demonstrate first aid procedures for electrical shock victims.	
1.3	Practice safe work habits.	

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Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 2: The learner will identify and develop a positive work attitude.

	Objectives	Measures
2.1	Develop positive work related and personal attitudes.	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
2.2	Actively pursue VICA achievement degree.	

Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 3: The learner will identify electrical tools.

Objectives	Measures
3.1 List electrical hand tools.	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
3.2 Select proper hand tool for a specific task.	

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Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 4: The learner will use electrical tools.

Objectives		Measures
4.1	**Perform simple operations using electrical tools.**	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
4.2	Demonstrate the ability to maintain electrical tools.	

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Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 5: The learner will identify and define terms used in the electrical trades.

Objectives	Measures
5.1 Identify energy sources.	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
5.2 Define "electrical units."	
5.3 Identify symbols used in electrical diagrams.	
5.4 Identify terms used to identify devices used in the electrical trades.	
5.5 Identify jobs found in the electrical trades.	

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Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 6: The learner will use Ohm's Law.

Objectives	Measures
6.1 Identify Ohm's Law.	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
6.2 Use Ohm's Law to compute voltage, current, and resistance.	
6.3 Apply Ohm's Law to a circuit.	

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Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 7: The learner will make electrical measurements.

Objectives	Measures
7.1 Identify electrical instruments used to measure volts, amperes, and resistance.	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
7.2 Use Ohmmeter to measure resistance.	
7.3 Use resistor color to read coded resistor values.	

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Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 8: The learner will analyze a DC resistive circuit.

Objectives	Measures
8.1 Interpret electrical diagram.	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
8.2 Connect series, parallel, and series-parallel circuits.	
8.3 Compute series, parallel, and series-parallel circuit values.	

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Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 9: The learner will analyze AC resistive circuits.

Objectives	Measures
9.1 Connect series-parallel circuits.	Refer to competency Test Item Bank VEC-T&I-C/TB
9.2 Compute series-parallel circuit values.	7601, 7602, 7603.

Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 10: The learner will analyze reactive circuits.

Objectives	Measures
10.1 Interpret electrical diagram.	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
10.2 Compute inductive reactance.	
10.3 Compute capacitive reactance.	
10.4 Compute impedence.	

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Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 11: The learner will analyze polyphase systems.

Objectives	Measures
11.1 Apply Ohm's Law to three phase circuit.	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
11.2 Identify delta-wye circuit characteristics.	
11.3 Compute delta-wye circuit transformations.	

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Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 12: The learner will identify magnetic law (Lenz).

Objectives	Measures
12.1 State rule of magnetic pole interaction.	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
12.2 Illustrate the field of magnetic lines produced by a magnet.	
12.3 Describe differences between a permanent and an electrically produced magnet.	
12.4 Apply generator principle.	

Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 13: The learner will identify electromechanical (E/M) devices.

Objectives	Measures
13.1 Identify and use E/M devices.	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
13.2 Maintain and service electromechanical devices.	

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Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 14: The learner will identify principles of electrical motors and generators.

Objectives	Measures
14.1 Identify types of electrical motors.	Refer to competency Test Item Bank VEC-T&I-C/TB
14.2 Identify motor mounts and enclosures.	7601, 7602, 7603.

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Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 15: The learner will identify motor controls.

Objectives	Measures
15.1 Determine conditions requiring motor controls (MC).	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
15.2 Interpret MC diagrams.	
15.3 Connect and test motor control circuits.	

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Grade Level: 10-12   Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 16: The learner will identify the scope of the appliance repair field.

Objectives	Measures
16.1 List classifications of electrical appliances.	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
16.2 Identify factors related to customer relations.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 17: The learner will identify and use electrical devices.

Objectives	Measures
17.1 Prepare list of motors, controls, and heating elements used in appliances.	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
17.2 Test appliance controls.	

Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 18: The learner will service appliances.

Objectives		Measures
18.1	Use the five-step trouble shooting procedure in appliance repair.	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
18.2	Test and calibrate thermostat.	
18.3	Test appliance motor operations.	
18.4	Test heating elements.	
18.5	Solder using silver solder.	
18.6	Repair a defective appliance.	
18.7	Keep work records for appliances repaired.	

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Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 19: The learner will identify conventional drawing symbols and electrical symbols used in building plans.

	Objectives	Measures
19.1	Interpret building symbols.	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
19.2	Interpret building plan electrical specifications and working drawings.	

Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 20: The learner will analyze building plans for electrical requirements.

Objectives	Measures
20.1 List electrical requirements found in typical building plans.	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
20.2 Summarize and develop a report on electrical requirements using building plans.	

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Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 21: The learner will measure and sketch a floor plan for the installation of electrical circuits.

Objectives	Measures
21.1 Demonstrate the ability to sketch a residential floor plan.	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
21.2 Demonstrate the ability to sketch electrical symbols.	
21.3 Demonstrate the ability to write estimates from measurements and diagrams.	

Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 22: The learner will identify the purpose and developer of the NEC.

Objectives	Measures
22.1 Explain purpose of NEC.	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
22.2 Identify the source of the NEC.	
22.3 Identify licensing procedures.	

Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 23: The learner will refer to NEC in determining electrical wiring requirements.

Objectives	Measures
23.1 Refer to NEC to determine building electrical requirements.	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
23.2 Determine wire size and type per NEC.	

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Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 24: The learner will determine the electrical requirement based on the National Electrical Code (NEC).

Objectives	Measures
24.1 Establish broad requirements.	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
24.2 Determine special requirements.	

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Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 25: The learner will interpret plans for electrical requirements.

Objectives	Measures
25.1 List electrical loads.	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
25.2 Determine special requirements.	

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Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 26: The learner will determine electrical loads.

Objectives	Measures
26.1 Calculate electrical load using preferred or optional method.	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
26.2 Select wire sizes and types.	

Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 27: The learner will plan branch circuits and feeder service.

Objectives	Measures
27.1 Lay out electrical branch circuits and service.	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
27.2 List household appliances that use branch circuits and feeder circuits.	

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Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 28: The learner will make an estimate for a typical residential installation.

	Objectives	Measures
28.1	Use appropriate sources to select and price electrical devices and wire.	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
28.2	Prepare an electrical installation estimate.	

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Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 29: The learner will make a typical residential electrical installation.

Objectives	Measures
29.1 Plan the installation.	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
29.2 Install devices and wire per NEC.	

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Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 30: The learner will identify special NEC requirements.

Objectives	Measures
30.1 Identify service equipment.	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
30.2 Determine power requirements.	

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Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 31: The learner will analyze a typical motor loaded branch circuit.

Objectives	Measures
31.1 Layout motor circuit.	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
31.2 Calculate circuit requirements.	

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Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 32: The learner will identify special NEC requirements.

Objectives	Measures
32.1 Identify raceway requirements.	Refer to competency Test Item Bank VEC-T&I-C/TB
32.2 Determine raceway size for a typical branch.	7601, 7602, 7603.

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Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 33: The learner will analyze a typical branch circuit.

Objectives	Measures
33.1 List characteristics of a typical branch circuit.	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
33.2 Write a summary of branch circuit use as related to household appliances.	

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Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 34: The learner will recognize conditions requiring low voltage.

Objectives	Measures
34.1 List applications specified in NEC.	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
34.2 Determine typical installation requirements.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Electrical Trades

COMPETENCY GOAL 35: The learner will install typical low voltage circuit.

Objectives	Measures
35.1 Layout typical low-voltage (LV) circuit.	Refer to competency Test Item Bank VEC-T&I-C/TB 7601, 7602, 7603.
35.2 Identify and select devices for LV circuit installation.	
35.3 Install LV circuit.	

Electronics Outline

1. Orientation

    a. Student expectation
    b. Safe working habits
    c. Hand tools

2. Basic Principles of Electricity/Electronics

    a. Law of charges
    b. Source of electricity

3. Fundamentals of Direct Current

    a. Direct current circuit
    b. Solering procedures
    c. Different numbering systems
    d. Resistance associated with Ohm's Law
    e. Measuring voltage
    f. Measuring current
    g. Power related to Ohm's Law
    h. Conductors and insulators
    i. Ohm's Law
    j. Voltage, current, and resistance in series circuits
    k. Voltage, current, and resistance in parallel circuits
    l. Simplifying series and parallel circuits
    m. Magnetic fields
    n. Motor torque, efficiency, and power

4. Fundamentals of Alternating Current

    a. Nature and alternating currents
    b. Principles of generation of AC
    c. Inductance
    d. Inductive reactance
    e. Calculations and statements for capacitance
    f. Measure for RC time constants
    g. Capacitive reactance
    h. RCL circuits (series)
    i. RCL circuits (parallel)

5. Applying for a job

6. Semiconductor Devices

    a. Terms and processes
    b. Skills associated with rectifiers
    c. Functions and applications filter circuits

    d. Functions of special semiconductor diodes
    e. Bi-polar transistors

7. Transistor Circuit Operation and Applications

    a. Test transistor circuits
    b. Transistor amplifier circuit operations
    c. Operational amplifier circuits

8. Logic Devices and Circuits

    a. Test logic devices
    b. Identify logic systems
    c. Special semiconductor devices and circuits

9. Transmitter and Receiver Circuits

    a. Oscillator circuits
    b. Transmitters and transmitting systems
    c. Receiver circuits
    d. Electron tubes

10. Leadership

    a. Characteristics
    b. Importance of parliamentary procedure
    c. Correct use of 17 parliamentary procedures
    d. VICA participation

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 1: The learner will familiarize her/himself with the opportunities in, the technical terms of, and the basic skills required by the field of electronics.

	Objectives	Measures
1.1	Match terms with definitions.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
1.2	Name employment opportunities.	
1.3	Arrange repair steps in sequence.	

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TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 2: The learner will identify safe working habits.

Objectives		Measures
2.1	Match terms with definitions associated with work habits.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
2.2	Identify safe working habits.	
2.3	Demonstrate first aid for shock.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 3: The learner will identify hand tools.

Objectives	Measures
3.1 Match hand tools to their use.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
3.2 List maintenance procedures for hand tools.	
3.3 Demonstrate proper use of hand tools.	

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TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 4: The learner will demonstrate the law of charges.

Objectives	Measures
4.1 Match terms with definitions associated with electrical charges.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
4.2 Name all particles of an atom.	
4.3 Discuss the law of charges.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 5: The learner will name the sources of electricity.

Objectives	Measures
5.1 Match terms with definitions associated with sources of electricity.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
5.2 Name six sources of electricity.	
5.3 Demonstrate the ability to: a. test batteries. b. produce electricity with: (1) magnetism (2) pressure (3) heat (4) light	

Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 6: The learner will construct a direct current circuit.

Objectives		Measures
6.1	Match terms with definition associated with DC.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
6.2	State Ohm's Law.	
6.3	Identify schematic symbols.	
6.4	Draw a circuit and show direction of current flow.	
6.5	Select true statements about open and closed circuits.	
6.6	Construct a circuit from a schematic.	

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TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 7: The learner will demonstrate correct soldering procedures.

	Objectives	Measures
7.1	Match terms with definitions associated with soldering.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
7.2	Show how to use soldering tools.	
7.3	Explain good soldering techniques.	
7.4	Demonstrate the ability to: a. strip and tin wire. b. solder and desolder wire to terminal strips. c. replace resistors on circuit board. d. splice several wires.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 8: The learner will convert numbers of different numbering systems.

	Objectives	Measures
8.1	Match terms with definitions associated with numbering systems.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
8.2	State the law of exponents when multiplying and dividing.	
8.3	Demonstrate the ability to: a. solve math problems. b. use electronic calculator. c. convert numbers between binary and decimal systems.	

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TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 9: The learner will demonstrate resistance as associated with Ohm's Law.

	Objectives	Measures
9.1	Match terms with definitions associated with resistance.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
9.2	Explain types of resistors.	
9.3	Match resistor symbols with terms.	
9.4	Use the color code for resistors.	
9.5	List four parts of an ohm-meter.	
9.6	Use ohm-meter.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 10: The learner will demonstrate ability to measure voltage.

Objectives	Measures
10.1 Match terms with definitions associated with voltage meters and measurement of voltage.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
10.2 Name main parts of voltmeter.	
10.3 Show how to use voltmeter.	
10.4 State Kirchhoff's law of voltage.	
10.5 Discuss polarity in resistance circuit.	
10.6 Measure voltage drops in series circuits.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 11: The learner will demonstrate measuring current.

Objectives	Measures
11.1 Match terms with definitions associated with current meters and measurement of current.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
11.2 Show how to measure current with a DC ammeter.	
11.3 Convert amperes to milliamperes and microamperes.	
11.4 Measure current at two points in a circuit.	
11.5 Measure current with two voltage levels.	

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TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 12: The learner will determine power as related to Ohm's law.

Objectives	Measures
12.1 Match terms with definitions associated with power.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
12.2 State three power formulas.	
12.3 State resistors wattage rating.	
12.4 List power safety precautions.	
12.5 Demonstrate the ability to: a. compute current using power formula. b. determine power used in a resistive circuit. c. explain the function of fuses and resistor power ratings.	

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Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 13: The learner will describe conductors and insulators.

Objectives	Measures
13.1 Match terms with definitions associated with conductors and insulators.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
13.2 Explain differences between conductors, semiconductors, and insulators.	
13.3 Name types of conductors.	
13.4 State wire size and gauge numbers.	
13.5 Give a statement on wire resistance.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 14: The learner will use Ohm's Law.

Objectives	Measures
14.1 Match terms with definitions associated with Ohm's Law.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
14.2 State Ohm'Law.	
14.3 Draw Ohm's Law chart.	
14.4 Demonstrate ability to use Ohm's Law with circuits.	
14.5 Solve problems for an: a. unknown voltage b. unknown current c. unknown resistance	

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Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 15: The learner will determine voltage, current, and resistance in series circuits.

Objectives	Measures
15.1 Match terms with definitions associated with series circuits.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
15.2 Measure unknown values.	
15.3 Demonstrate ability to: a. analyze current in a series circuit. b. analyze resistance and power in a series circuit.	

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Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 16: The learner will select proper statements for voltage, current, and resistance in a parallel circuit.

Objectives	Measures
16.1 Match terms with definitions associated with parallel circuits.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
16.2 Select rules for voltage and current in a parallel circuit.	
16.3 Use formula for parallel resistance.	
16.4 Analyze a parallel circuit.	
16.5 State effects of open and shorts in parallel circuits.	
16.6 Demonstrate the ability to measure voltage, current, and resistance in a parallel circuit.	

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Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 17: The learner will arrange steps in proper order to simplify a series-parallel circuit.

Objectives	Measures
17.1 Match terms with definitions associated with series-parallel circuits.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
17.2 State Kirchhoff's current law.	
17.3 List steps in order to simplify a series parallel circuit.	
17.4 Describe function of a voltage divider.	
17.5 Demonstrate the ability to: a. measure and calculate quantities in series parallel circuits. b. construct a voltage divider and analyze its function.	

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Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 18: The learner will describe magnetic fields.

	Objectives	Measures
18.1	Match terms with definitions associated with magnetics.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
18.2	Name two types of magnets.	
18.3	Name two ways to produce magnets.	
18.4	Discuss induction.	
18.5	Construct a simple electromagnet and check its operation.	

Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 19: The learner will discuss motor torque and efficiency and calculate motor power.

Objectives	Measures
19.1 Match terms with definitions associated with motors.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
19.2 Discuss the production of motor torque.	
19.3 Identify parts of DC motor.	
19.4 Calculate motor power.	

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Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 20: The learner will match and identify terms dealing with the nature of alternating currents.

Objectives	Measures
20.1 Match terms, definitions, abbreviations, functions, and values of alternating currents.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
20.2 Identify terms, true statements, and frequency ranges of alternating current.	
20.3 Demonstrate sine wave value, relationship, cycle, and conversions.	
20.4 List formulas, compute period, wave length, and instantaneous sine voltage values.	

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Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 21: The learner will discuss and demonstrate principles of generation of AC.

Objectives	Measures
21.1 Match terms and select requirements for AC generation. Select true statements concerning induction, magnitude of generated voltage, elementary cycle generation, phasors, or vectors, and phase angle diagrams.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
21.2 Discuss left hand generator rule, generator construction, and three phase power generation.	
21.3 State two rules for DC generator construction.	
21.4 Demonstrate ability to determine current flow generation, compute AC cycle instanteneous values. Construct a simple generator and identify its components.	

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Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 22: The learner will state formulas and terms dealing with inductance.

Objectives	Measures
22.1 Demonstrate knowledge of terms, abbreviations, definitions, factors affecting inductance, types of inductors, formulas for total series and parallel inductors, factors of mutal inductance, and ability to compute transformer ratios.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
22.2 State Lenz's law and formula for a Henry. Discuss self inductance. Know formulas for mutual aiding opposing inductance.	

Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 23: The learner will describe inductive reactance.

Objectives	Measures
23.1 Match terms, symbols, and definitions. Select statements describing current and voltage statements in RL circuits and their time constants.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
23.2 State formulas for computing inductive reactance, true power, apparent power, reactive power, power factor, and the Q of an inductor.	
23.3 Compute applied voltage and impedance of series RL CKT, inductive reactance, complete labels on a universal time constant chart, and list three factors needed for computing inductive reactance.	

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Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 24: The learner will demonstrate calculations and statements for capacitance.

Objectives	Measures
24.1 Match capacitor terms, symbols, and types.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
24.2 Select true statements for capacitance function in circuit construction, DC charging, and discharging and formulas.	
24.3 State formulas for total parallel capacitance, several unequal series capacitors, total of two capacitors in series, equal series capacitors, and two rules concerning capacitor color coding.	
24.4 Demonstrate ability to compute capacitance values, test capacitors with an ohm-meter, examine the construction of capacitors, and determine the effect of AC and DC on capacitors.	

Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 25: The learner will match terms and list units of measure for RC time constants.

Objectives	Measures
25.1 Match terms, definitions, illustrations of wave shapes, and values during charge and discharge--state formulas for computing RC time constants.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
25.2 List the following: units of measurements for universal RC time constant chart; exponential formula for voltage across a capacitor and resistor in an RC circuit when formula is given, and current when formula is given; units of measure in the exponential formula for voltage across resistor in RC circuit during discharge when formula is given. Review RC and RI characteristics.	

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Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 26: The learner will match terms and select statements for capacitive reactance.

Objectives	Measures
26.1 Match terms, symbols, and definitions. State formula for computing capacitive reactance and the Q of a capacitor. capacitor.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
26.2 Select true statements indicating relationship of a voltage and current--list factors of capacitive reactance. Distinguish between true power, apparent power, reactive power, and the power factor. Determine phase relationships and compute values of RC circuits.	

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Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 27: The learner will demonstrate functions and applications of series RCL circuits.

Objectives	Measures
27.1 Match terms and definitions, reactance in series circuit, voltages, and their relationship in RCL circuit. State formulas for series impedance, applied voltage in terms of voltage drops, resonant frequency, and bandwidth.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
27.2 Select true statements regarding impedance in RCL circuits, Q of a series tuned circuit. List conditions existing in a resonant RCL circuit and solve problems of reactance impedance and parameters of resonant circuits.	

Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 28: The learner will match terms and definitions for parallel RCL circuits.

	Objectives	Measures
28.1	Match terms and definitions associated with RCL circuits. Select true statements concerning voltage and current, resonance, tuned parallel RCL circuits, Q of a parallel circuit.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
28.2	State formulas for total current, impedance, resonant frequency, and bandwidth of parallel RCL circuits. Complete chart of character of series and parallel circuits. Solve RL, RC, and RLC related problems. Analyze a parallel resonant circuit and determine resonant frequency.	

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Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 29: The learner will be able to prepare a resume, write a letter of application, complete an application form, conduct oneself properly and advantageously during an employment interview, and follow-up that interview with a letter.

Objectives	Measures
29.1 Match terms associated with applying for a job with correct definitions. List sources for locating job openings, and methods of applying for a job. Distinguish between employer/employee relations.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
29.2 Select an application for information, attitudes, and attributes desired by employer. Examples of proper conduct during an interview. Prepare resume, write letter of application, complete application form, and write a follow-up letter after interview.	

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Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 30: The learner will identify terms and processes involved with semiconductor devices.

Objectives	Measures
30.1 Match terms associated with P-N junctions.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
30.2 Identify schematic symbols and circuit applications as associated with semiconductors.	
30.3 Draw and label P-N junctions with regard to bias.	
30.4 Identify P-N junction voltages and characteristics curves.	
30.5 Test P-N junctions.	

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Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 31: The learner will perform skills associated with rectifiers.

Objectives	Measures
31.1 Match terms and definitions associated with rectifiers and rectifier circuits.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
31.2 Identify, test, and construct conventional rectifier.	
31.3 Compute formulas associated with rectifier.	

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Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 32: The learner will demonstrate functions and applications of filter circuits.

Objectives	Measures
32.1 Match terms and definitions associated with filter circuits.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
32.2 Identify and explain the three most common filter circuits.	
32.3 Construct and test filter circuits.	

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Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 33: The learner will demonstrate functions of special semiconductor diodes.

Objectives	Measures
33.1 Match terms and definitions associated with special semiconductors.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
33.2 Identify schematic symbols and letter symbols of special semiconductors.	
33.3 State purpose and characteristics of special semiconductors.	

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Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 34: The learner will develop skills associated with Bi-Polar Transistors.

Objectives	Measures
34.1 Match terms and definitions associated with Bi-Polar Transisters.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
34.2 Draw and label transistor circuits and current paths.	
34.3 Identify schematic symbols biasing arrangements, schematic symbols, and bias diagrams.	
34.4 Test transistors.	

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Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 35: The learner will identify and test transistor circuits.

Objectives	Measures
35.1 Match terms related to basic transistor circuits with their correct definitions.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
35.2 Name the three basic types of transistor circuits.	
35.3 Match transistor circuits with terms or values for circuit current gain with which they are associated.	
35.4 Identify the three basic types of transistor circuits.	
35.5 Complete a table showing the relative magnitude of current, voltage, and power gain for basic transistor circuits.	
35.6 State which transistor circuit types give signal phase reversal.	
35.7 Match transistor circuits with their common applications.	
35.8 Complete a table showing the relative magnitudes of the input and output impedances for basic transistor circuits.	

Grade Level: 10-12

Skills/Subject Area: Electronics

COMPETENCY GOAL 25: The learner will identify and test transistor circuits.

Objectives	Measures
35.9 Compute voltage, current, and power stage gain in db.	
35.10 Demonstrate the ability to construct and test a common emitter, base, collector, and plot output characteristic curve for each.	

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Grade Level: 10-12   Skills/Subject Area: Electronics

COMPETENCY GOAL 36: The learner will identify, construct, and test transistor amplifier circuit operations.

Objectives	Measures
36.1 Match terms related to transistor amplifiers with their correct definitions.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
36.2 Identify a voltage divider bias circuit.	
36.3 Select true statements concerning leakage current and problems associated with it.	
36.4 Complete a table showing the classes of amplifiers, applications, and performance characteristics.	
36.5 Select true statements describing the characteristics of a Darlington pair circuit, a class B push-pull amplifier, and frequency considerations.	
36.6 Locate the Q point, saturation point, and cut-off point of a common emitter amplifier circuit.	
36.7 Complete a list showing the characteristics of different types of coupling.	
36.8 Distinguish between ratio stage gains and db stage gains in overall amplifier gain.	
36.9 Construct a load line for a common emitter amplifier circuit.	

Skills/Subject Area: Electronics

COMPETENCY GOAL 36: The learner will identify, construct, and test transistor amplifier circuit operations.

Objectives	Measures
36.10 Calculate the overall gain of a multi-stage amplifier circuit.	
36.11 Demonstrate the ability to test a single-ended amplifier, a push-pull amplifier, a two stage DC amplifier, and a Darlington pair amplifier.	

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Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 37: The learner will identify, construct, and test operational amplifier circuits.

	Objectives	Measures
37.1	Match terms related to operational amplifier with their definitions.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
37.2	Complete a diagram to show the categories and subdivisions of integrated circuits.	
37.3	Distinguish between the advantages and disadvantages of integrated circuits.	
37.4	Match inverting and noninverting operational amplifiers with their characteristics and av formulas.	
37.5	Match DC summing inverting and differential amplifiers with their characteristics and voltage out formulas.	
37.6	Calculate the closed-loop gain for an inverting and noninverting amplifier and the output voltage of a DC summing inverting amplifier.	
37.7	Construct and test an inverting amplifier, a noninverting amplifier, a DC summing simplifier, and a differential amplifier.	

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Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 38: The learner will match, identify, construct, and test logic devices.

Objectives	Measures
38.1 Match terms related to logic devices with their correct definitions.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
38.2 Identify the schematic symbols and complete truth tables for AND gates, OR gates, NAND gates, NOR gates, Exclusive-OR gates, and NOT gates.	
38.3 Demonstrate the ability to construct and test an IC AND gate circuit, an IC OR gate circuit, an IC NAND gate circuit, an IC Exclusive-OR gate circuit, and a diode-transistor NOR gate circuit.	

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Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 39: The learner will match terms and identify systems of logic.

Objectives	Measures
39.1 Match terms related to systems of logic with their correct definitions.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
39.2 Write the binary equivalent of a sequence of decimal numbers.	
39.3 Add numbers expressed in binary digits.	
39.4 Complete a truth table for a half-adder.	
39.5 Identify multi-vibrator types given the input and output signal waveforms.	
39.6 Convert decimal numbers to their equivalent BCD.	
39.7 Demonstrate the ability to construct and test a four-bit shift register.	

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Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 40: The learner will identify and match terms associated with special semiconductor devices and circuits.

Objectives	Measures
40.1 Match terms related to semiconductor devices with their correct definitions.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
40.2 Identify the schematic for an/a SCR, Triac, diac, VJT, PVT, and a JFET.	
40.3 Sketch the output characteristics curves of a/an SCR, Triac, VJT, and JFET.	
40.4 Select true statements concerning the characteristics of an SCR.	
40.5 Select true statements concerning diac applications thermistor applications, and VFT applications.	
40.6 Distinguish between the schematic symbols for two types of thermistors and FET's.	
40.7 Distinguish between the advantages of a PVT over a VJT.	

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Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 41: The learner will identify, construct, and test various types of oscillator circuits.

Objectives	Measures
41.1 Match terms related to oscillators with the correct definition.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
41.2 Identify the circuit schematic diagrams for a Hartley oscillator, a Colpitts oscillator, a Clapp oscillator, a Pierce oscillator, a TBTC oscillator, and an RC oscillator.	
41.3 Demonstrate the ability to construct and test a Hartley oscillator and an RC oscillator.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 42: The learner will identify, match, and make calculations associated with transmitters and transmitting systems.

Objectives	Measures
42.1 Match terms related to transmitters with their correct definitions.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
42.2 Identify the stages found in an/a CW transmitter, AM broadcast transmitter, and FM broadcast transmitter.	
42.3 Identify the stages found in a television transmitting system.	
42.4 Calculate the wave length (d) of a signal given the frequency and calculate the length of a Hertz and a Marconi antenna which will be resonant at this frequency.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 43: The learner will identify, match, and select statements associated with receiver circuits.

Objectives	Measures
43.1 Match terms related to receivers with their correct definitions.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
43.2 Identify the stages in an AM superheterodyne receiver and an FM receiver.	
43.3 Select the frequency ranges for AM and FM broadcast stations and the governmental agency that licenses radio stations and assigns broadcast frequencies.	
43.4 Select the true statements concerning the FR amplifier stage in AM and FM receivers and the IF amplifier stage of AM and FM receivers.	
43.5 State the output frequencies of the mixer stage given the frequency of the RF signal and the local oscillator frequency.	
43.6 Select the stage that recovers the audio signal from the amplitude modulated RF signal.	
43.7 Select the statements that describe the function of the limited stage in an FM receiver.	
43.8 Select another name for FM detection circuit.	
43.9 Demonstrate the ability to identify the stages of an FM receiver.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Electronics

COMPETENCY GOAL 44: The learner will identify, match, and label various types of electron tubes.

Objectives	Measures
44.1 Match terms related to electron tubes with their correct definitions.	Refer to competency Test Item Bank VEC-T&I-C/TB 7641, 7642, 7643.
44.2 Identify the schematic symbols for diodes, triodes, pentodes, tetrodes, beam power tubes, and thyratrons.	
44.3 Label the pin numbers given the bottom view of a seven-pin and an eight-pin tube.	
44.4 Identify typical characteristics curves for diode, triode, and pentode vacuum tubes.	
44.5 Demonstrate the ability to construct and test a vacuum tube diode rectifier.	

Furniture Outline

1. Orientation
    a. Occupational outlook of the trade
    b. Furniture history

2. Mathematics for Furniture Making
    a. Adding and subtracting common fractions
    b. Multiplying and dividing common fractions
    c. Decimal fractions and conversions
    d. Board foot calculation

3. Furniture Periods and Styles
    a. General furniture technology
    b. History and identification of furniture
    c. Furniture Design

4. Furniture Woods
    a. Types of woods
    b. Growth of wood and defects
    c. Grading and ordering lumber
    d. Plywood

5. Wood Fastening
    a. Wood joints and cuts
    b. Metal fasteners
    c. Glues, clamps, and gluing

6. Preparation for Construction
    a. Drawing equipment
    b. Making drawings
    c. Material bills, procedures, and lumber selection

7. Hand Tools
    a. Layout and measuring tools
    b. Laying out stock
    c. Drilling and boring tools
    d. Uses of drilling and boring tools
    e. Scraping and shaving tools
    f. Uses of scraping and shaving tools

g. Handsaws
h. Squaring stock
i. Pounding and driving tools
j. Sharpening hand tools

8. Portable Tools

   a. Portable drills
   b. Portable sanders
   c. Portable circular saws
   d. Portable sabre saws
   e. Portable routers and laminate trimmers

9. Stationary Power Tools

   a. Drill press
   b. Mortisers
   c. Scroll saws
   d. Band saw
   e. Table saw (circular saw)
   f. Radial arm saws
   g. Planing machines
   h. Sanders
   i. Shapers
   j. Wood lathes

10. Furniture Construction

   a. Box, case, and carcass construction
   b. Table and chair construction
   c. Cabinet and furniture hardware

11. Special Construction

   a. Bending wood
   b. Veneering and inlaying
   c. Built-in cabinets

12. Furniture Finishing

   a. Preparing wood for finishing
   b. Finishing by hand
   c. Spray finishing
   d. Finishes

13. Safety

   a. Personal safety
   b. Job safety

14. Human Relations and Leadership

    a. Job advancement
    b. Free enterprise system
    c. Becoming a good leader
    d. Leadership development

15. Leadership

    a. Characteristics
    b. Importance of parliamentary procedure
    c. Correct use of 17 parliamentary procedures
    d. VICA participation

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 1: The learner will understand the skills required by and the occupational outlook of the furniture making trade.

Objectives	Measures
1.1 Recognize terms associated with the definition of the trade.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
1.2 Identify employment opportunities for the furniture maker.	
1.3 Recognize factors concerning the occupational outlook for the furniture making trade.	
1.4 Identify five worker requirements for the furniture making industry.	
1.5 Describe the history of furniture.	
1.6 Fill in a personal information sheet.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 2: The learner will recognize terms and definitions associated with basic trade arithmetic and calculate problems for the furniture trade.

Objectives	Measures
2.1 Discuss the meaning of fractions.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
2.2 Demonstrate addition, subtraction, multiplication, and division of fractions.	

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TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 3: The learner will recognize terms and definitions associated with basic trade arithmetic and calculate problems for the furniture trade.

Objectives	Measures
3.1 Define terms and recite rules used in multiplying fractions.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
3.2 Define terms and recite rules used in dividing fractions.	

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TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 4: The learner will recognize terms and definitions associated with basic trade arithmetic and calculate problems for the furniture trade.

Objectives	Measures
4.1 Add and substract decimal fractions.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
4.2 Multiply and divide decimal fractions.	
4.3 Convert fractions to decimals.	
4.4 Convert decimals to fractions.	

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TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 5: The learner will recognize various cuts of wood and work board foot problems.

Objectives	Measures
5.1 Describe various cuts of wood that equal a board foot.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
5.2 List dimensions as they appear on an invoice.	
5.3 Work board foot problems using the inch formula.	
5.4 Work board foot problems using the inch formula.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 6: The learner will recognize the terms related to furniture parts.

Objectives	Measures
6.1 Define various terms that are related to furniture and furniture parts.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
6.2 List five styles of furniture and designate periods.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 7: The learner will describe the different designs of furniture and distinguish among them, describe the types of furniture legs and feet, and discuss the characteristics of Renaissance, Baroque, Rococo, Neoclassical, and American styles in furniture.

Objectives	Measures
7.1 Describe mirror and cabinet designs.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
7.2 Distinguish among various chair back designs	
7.3 Describe the types of furniture legs and feet.	
7.4 Discuss various types of tables.	
7.5 Discuss the characteristics of Renaissance, Baroque, Rococo, Neoclassical, and American styles in furniture.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 8: The learner will identify meanings, name different shapes in furniture, list types of balance, and give standard sizes of furniture.

Objectives	Measures
8.1 Explain the meaning of "balance."	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
8.2 Name the shapes that may be used in furniture design.	
8.3 List the three types of balance.	
8.4 Define the meaning of "emphasis" in furniture design.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 9: The learner will distinguish among the various hardwoods and softwoods, and state their characteristics and identify the exotic woods.

Objectives	Measures
9.1 Give examples of softwoods and their characteristics.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
9.2 Name various hardwoods and their characteristics.	
9.3 Name several exotic woods used in furniture construction and give their characteristics.	

Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 10: The learner will distinguish among the various types of woods, trace the growth of wood in seasons, identify the effects of moisture, and discuss the different types of defects in woods.

Objectives	Measures
10.1 Discuss the structures of various types of wood.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
10.2 Trace the growth of wood in different seasons.	
10.3 Discuss the effects of moisture on woods.	
10.4 List and discuss the different types of defects that are found in woods.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 11: The learner will identify the various softwood and hardwood grades of lumber and place an order for softwood or hardwood lumber.

Objectives	Measures
11.1 List the various softwood grades of lumber.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
11.2 List the various hardwood grades of lumber.	
11.3 Discuss softwood and hardwood dimensions.	
11.4 Correctly place an order for softwood or hardwood lumber.	

Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 12: The learner will identify the characteristics used for grading plywood; discuss cutting, drilling, fastening, and gluing plywood; and make out an order.

Objectives	Measures
12.1 Give basic characteristics used for grading plywood.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
12.2 Discuss cutting, drilling, fastening, and gluing plywood.	
12.3 Make out an order for plywood.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 13: The learner will recognize various wood joints; identify the uses of individual wood joints along with the various cuts that are used; and make drawings of wood joints and of cuts that are made.

Objectives	Measures
13.1 Define and make drawings of the various wood joints that are used by the furniture maker.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
13.2 Discuss the uses of individual wood joints.	
13.3 Define and make drawings of various cuts that are made by the furniture maker.	
13.4 Discuss the uses of individual cuts during the construction of furniture.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 14: The learner will recognize types of nails, identify the types and sizes of wood screws, and give steps in fastening wood with screws.

Objectives	Measures
14.1 Define the various types of nails that are used in furniture making.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
14.2 Give types and sizes of wood screws.	
14.3 Give the steps in fastening wood together with screws.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 15: The learner will recognize wood glues and their uses and discuss the methods used in gluing wood together.

Objectives	Measures
15.1 Define the various wood glues and give the uses of them.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
15.2 List the types of glue clamps and give their uses.	
15.3 Discuss methods used in gluing wood.	
15.4 Demonstrate proper gluing techniques while constructing a drawer and/or bookcase project.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 16: The learner will identify a T-square, triangles, scales, and their uses.

Objectives	Measures
16.1 Discuss a T-square and its uses.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
16.2 Discuss triangles and their uses.	
16.3 Discuss scales and their uses.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 17: The learner will explain and make an orthographic drawing, an oblique drawing, and an isometric drawing; identify and draw conventional lines; and dimension a drawing.

Objectives	Measures
17.1 Discuss and sketch orthographic drawings.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
17.2 Discuss and sketch oblique drawings.	
17.3 Discuss and sketch isometric drawings.	
17.4 Describe and draw various conventional lines.	
17.5 Dimension a drawing.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 18: The learner will make a bill of materials, discuss the plan of procedure, and identify factors in lumber selection for an article of furniture.

Objectives	Measures
18.1 Develop a bill of materials for an article of furniture.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
18.2 Discuss the purpose and content of a plan of procedure.	
18.3 Name some factors in selecting lumber for an article of furniture.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 19: The learner will identify the names and uses of tools used for linear and angular measurement and discuss the care and maintenance of tools.

Objectives	Measures
19.1 Give the names and uses of tools used for linear measurement.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
19.2 Give the names and uses of tools used for angular measurement.	
19.3 Discuss the care and maintenance of layout and measuring tools.	
19.4 Demonstrate your measuring ability by laying out a drawer or other furniture products.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 20: The learner will identify the layout of lengths, widths, thicknesses, angles, curves, and duplicate parts of wood stock using layout and measuring tools; identify hexagons and octagons; identify the dividing of widths of wood stock; and discuss the transfer of inside measurements.

Objectives		Measures
20.1	Discuss the layout of lengths, widths, and thicknesses using layout and measuring tools.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
20.2	Discuss the layout of angles and curves using layout and measuring tools.	
20.3	Discuss the layout of duplicate parts of wood stock using layout and measuring tools.	
20.4	Discuss the layout of hexagons and octagons using layout and measuring tools.	
20.5	Discuss the dividing of widths of wood stock into equal spaces using rules.	
20.6	Discuss the transfer of inside measurements from one location to another.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 21: The learner will identify the types of hand drills and parts of twist drills; discuss braces and the various bits used in them; identify depth gauges and doweling jigs; and list care and maintenance procedures for these tools.

Objectives		Measures
21.1	Discuss the types of hand drills used in furniture making.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
21.2	Discuss the types and parts of twist drills.	
21.3	Discuss braces and various bits used in them.	
21.4	Discuss depth gauges and doweling jigs.	
21.5	Give the care and maintenance procedures used for drilling and boring tools.	
21.6	Demonstrate using a boring tool in drilling pilot holes for a drawer or furniture product.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 22: The learner will identify the uses of hand drills, discuss the uses of a brace, and give the proper use of various wood-boring bits.

Objectives	Measures
22.1 Give some uses of hand drills.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
22.2 Discuss the use of a brace.	
22.3 Give the proper uses of various wood-boring bits.	
22.4 Demonstrate various wood-boring bits while manufacturing bookcases or other furniture.	

Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 23: The learner will identify the types and parts of hand planes; discuss files, rasps, hand scrapers, wood chisels, and gouges; and give the care and maintenance of scraping and shaving tools.

Objectives		Measures
23.1	Discuss the types and parts of hand planes.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
23.2	Discuss files and rasps.	
23.3	Discuss hand scrapers.	
23.4	Give the care and maintenance of scraping and shaving tools.	
23.5	Demonstrate the use of scraping tools in finishing a bookcase or other furniture.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 24: The learner will identify uses of hand planes and scraping tools and give procedures for using files, rasps, wood chisels, and gouges.

Objectives		Measures
24.1	Discuss proper uses of hand planes.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
24.2	Give proper procedures for using files and rasps.	
24.3	Discuss proper uses of scraping tools.	
24.4	Give proper procedures for using wood chisels and gouges.	
24.5	Demonstrate the use of chisels in completing three wood joints used in furniture construction.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 25: The learner will identify the types of handsaws, distinguish between the cuts of the crosscut saw and the ripsaw, give procedures for making saw cuts, and discuss care and maintenance of handsaws.

Objectives	Measures
25.1 List the types of handsaws used in furniture making.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
25.2 Compare the cuts of the crosscut saw and and the ripsaw.	
25.3 Give procedures for making saw cuts.	
25.4 Discuss the care and maintenance of handsaws.	
25.5 Demonstrate use of handsaws in rough-cutting lumber.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 26: The learner will identify the steps in squaring stock and discuss the use of hand planes and handsaws to square stock.

Objectives	Measures
26.1 List the six steps in squaring stock.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
26.2 Discuss the use of hand planes and handsaws to square stock.	
26.3 Demonstrate how to square a board in making a side for a drawer or bookcase.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 27: The learner will explain the claw hammer and its uses and explain the types and parts of screwdrivers.

Objectives	Measures
27.1 Discuss the claw hammer and its uses.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
27.2 Discuss the types and parts of screwdrivers.	
27.3 Demonstrate use of a screwdriver in assembling a drawer.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 28: The learner will explain how to sharpen hand tools.

Objectives	Measures
28.1 Tell how to sharpen scraping and shaving tools.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
28.2 Tell how to sharpen handsaws.	
28.3 Tell how to sharpen drilling and boring tools.	
28.4 Demonstrate how to sharpen a twist drill.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 29: The learner will identify types of electric drills and their construction, explain accessories used on the portable drill, and give the uses of drills.

Objectives	Measures
29.1 Discuss types of electric drills and their construction.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
29.2 Discuss accessories that may be used on a portable drill.	
29.3 Give the uses of the portable electric drill.	

Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 30: The learner will discuss portable belt sanders and finishing sanders--their uses, care, and maintenance.

Objectives	Measures
30.1 Discuss portable belt sanders and their use.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
30.2 Discuss portable finishing sanders and their uses.	
30.3 Discuss the care and maintenance of portable sanders.	
30.4 Demonstrate how to replace a belt on a portable sander.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 31: The learner will identify a portable circular saw, list the types of blades, and discuss the uses of the saw. Discuss setting and gumming saw blades.

Objectives	Measures
31.1 Identify a portable circular saw.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
31.2 List the types of saw blades that may be used on the portable circular saw.	
31.3 Discuss the various uses of the portable circular saw.	
31.4 Discuss setting and gumming circular saw blades.	
31.5 Demonstrate how to use a portable saw by cutting a plywood panel for a project.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 32: The learner will discuss the types, uses, and proper care of saber saws.

Objectives	Measures
32.1 Discuss the various types of saber saws.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
32.2 Discuss the uses of the saber saw.	
32.3 Discuss the care necessary to keep the saber saw in good condition.	
32.4 Demonstrate how to cut and curve in a piece of stock for a wall shelf.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 33: The learner will describe the router and bits, the uses of the router, and the care and maintenance of laminate trimmers.

Objectives		Measures
33.1	Discuss the various uses of the portable router.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
33.2	Give characteristics of router bits.	
33.3	Discuss the care and maintenance of routers and laminate trimmers.	
33.4	Demonstrate how to use a router to make a dovetail joint for a drawer.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 34: The learner will analyze the drill press, explain the adjustments that can be made, discuss the uses, and list the accessories that may be used.

Objectives	Measures
34.1 Name the basic parts of a drill press.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
34.2 Discuss the adjustments that may be made on the drill press.	
34.3 Discuss the uses of the drill press.	
34.4 List the accessories that may be used on the drill press.	
34.5 Demonstrate how to use a drill press to drum sand a curved surface.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 35: The learner will recognize the types of mortisers and their adjustments, and explain their care and safety precautions.

Objectives	Measures
35.1 Name the two types of mortisers.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
35.2 List the adjustments that are made on the mortisers.	
35.3 Discuss care and safety precautions that are necessary in the operation of the mortiser.	
35.4 Demonstrate how to use a mortise machine by making a mortise and tenon joint.	

Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 36: The learner will list the parts of, give adjustments for, and explain safety rules relating to scroll saws.

Objectives		Measures
36.1	Name the parts of a scroll saw.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
36.2	Give the adjustments that are made on a scroll saw.	
36.3	Give the safety rules for using a scroll saw.	
36.4	Demonstrate how to use a scroll saw by cutting out the sides of a wall shelf.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 37: The learner will recognize the parts of, give adjustments for, and discuss various uses and safety rules relating to band saws.

Objectives	Measures
37.1 Name the parts of the band saw.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
37.2 Give the adjustments necessary for operation of the band saw.	
37.3 Discuss the various uses of the band saw.	
37.4 List the safety rules for using the band saw.	
37.5 Demonstrate how to use a band saw by cutting out a wall shelf.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 38: The learner will recognize the parts of, the adjustments for, and explain the uses and safety rules relating to table saws.

Objectives	Measures
38.1 Name the parts of a table saw.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
38.2 Discuss the adjustments that may be made on the table saw.	
38.3 Discuss the various uses of the table saw.	
38.4 Give safety rules for using the table saw.	
38.5 Demonstrate the use of the table saw by finish cutting the pieces of a bookcase.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 39: The learner will recognize the parts of the necessary adjustments for, and the uses and the safety procedures relating to radial arm saws.

Objectives	Measures
39.1 Name the part of the radial arm saw.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
39.2 Give the adjustments necessary for setting up the radial arm saw.	
39.3 Discuss the uses of the radial arm saw.	
39.4 Discuss some safety precautions for using the radial arm saw.	
39.5 Demonstrate how to use a radial arm saw by cutting boards to a specified length.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 40: The learner will recognize the parts of, give necessary adjustments for, and discuss the uses and the safety procedures relating to planing machines.

Objectives	Measures
40.1 Name the parts of the jointer.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
40.2 Give the adjustments necessary for setting up the jointer.	
40.3 Discuss the uses of the jointer.	
40.4 Name the parts of the surfacer.	
40.5 Give the adjustments necessary for setting up the surfacer.	
40.6 Discuss the uses of the surfacer.	
40.7 Discuss safety measures for using the jointer and the surfacer.	
40.8 Use a jointer and surfacer to machine finish a book case.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 41: The learner will know different types of sanders, their adjustments, uses, and proper care.

Objectives	Measures
41.1 Name various types of sanders.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
41.2 Give the adjustments for setting up sanders.	
41.3 Discuss the use of sanders.	
41.4 Give key points for maintaining and caring for sanders.	
41.5 Demonstrate how to use sanders and abrasives to prepare the wood in your project for finishing materials.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 42: The learner will know the parts, the adjustments, the uses, and safety rules relating to shapers.

Objectives		Measures
42.1	Name the parts of the wood shaper.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
42.2	Describe the adjustments that can be made on the wood shaper.	
42.3	Discuss the various uses of the wood shaper.	
42.4	Discuss the safety rules to observe when using the wood shaper.	
42.5	Demonstrate how to use a wood shaper by cutting the drawer fronts according to plans.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 43: The learner will recognize the parts and tools used with the lathe; explain the procedures used in spindle and faceplate turning; explain sanding and finishing procedures; and provide the safety rules.

Objectives	Measures
43.1 Name the parts of a wood lathe.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
43.2 Name lathe tools used with the wood lathe.	
43.3 Discuss the procedures used in spindle turning.	
43.4 Discuss the procedures in faceplate turning.	
43.5 Discuss the procedures for sanding and finishing on the wood lathe.	
43.6 Give the key safety rules to observe when using the wood lathe.	
43.7 Demonstrate how to use a wood lathe by turning a cylindrical object.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 44: The learner will describe box-type furniture, case-type furniture, and carcass-type furniture; discuss the frame and panel construction; and explain the construction of drawers and doors.

Objectives	Measures
44.1 Describe box-type furniture.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
44.2 Describe case-type furniture.	
44.3 Describe carcass-type furniture.	
44.4 Discuss the types of frame and panel construction.	
44.5 Discuss the construction of drawers and doors.	
44.6 Demonstrate case construction by completing the bookcase project of your selection.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 45: The learner will describe the types and parts of tables and chairs, explain the construction of tables, and explain the assembly of a chair.

Objectives	Measures
45.1 Describe the types and parts of tables.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
45.2 Discuss construction of tables.	
45.3 Describe chairs and their parts.	
45.4 Discuss the assembly of a chair.	
45.5 Demonstrate your knowledge of chair construction by constructing a chair of your design.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 46: The learner will explain the types of furniture hinges and their features; provide a description of pulls and knobs, explain the types of catches and locks, explain furniture casters, and select and install proper hardware.

Objectives	Measures
46.1 Discuss the types of furniture hinges and their features.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
46.2 Give a description of pulls and knobs available for cabinets and furniture.	
46.3 Describe the types of catches that may be used on cabinets and furniture.	
46.4 Discuss furniture casters.	
46.5 Describe the types of locks used on furniture.	
46.6 Select and install proper hardware on a project of your selection.	

Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 47: The learner will recognize wood bend by the saw kerf method, the steaming method, and the laminating method.

Objectives	Measures
47.1 Discuss the bending of wood by the saw kerf method.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
47.2 Discuss bending of wood by the steaming method.	
47.3 Discuss the bending of wood by the laminating method.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 48: The learner will understand the different methods of cutting, assembling, and gluing veneers, as well as how to border, assemble, and picture inlays.

Objectives	Measures
48.1 Discuss the different methods used in cutting veneers.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
48.2 Give the procedures used in matching veneers.	
48.3 Discuss assembly and gluing of veneers.	
48.4 Discuss border, assembled, and picture inlays.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 49: The learner will discuss standards for kitchen cabinets, including the framing and the facing features, their construction and installation.

Objectives	Measures
49.1 Discuss standards for building kitchen cabinets.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
49.2 Discuss the framing and facing features necessary in kitchen cabinet construction.	
49.3 Discuss construction and installation of kitchen cabinet tops.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 50: The learner will discuss the different types and grades of sandpaper, discuss hand sanding, and discuss the use of power sanders for preparing wood for finishes.

Objectives	Measures
50.1 Discuss the various types and grades of sandpaper.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
50.2 Discuss hand sanding.	
50.3 Briefly discuss the use of power sanders for preparing wood for finishes.	
50.4 Demonstrate how to sand a wall shelf for final finishing.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 51: The learner will recognize types and uses of finishes applied by hand, explain brushes and their care, and provide ways of applying finishes by hand.

Objectives	Measures
51.1 List types and uses of finishes applied to furniture.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512,7513.
51.2 Discuss brushes and their care.	
51.3 Discuss ways of applying finishes by hand.	
51.4 Demonstrate how to finish a project by hand by finishing your project.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 52: The learner will discuss compressors, air transformers, spray guns, spraying procedures, finishing on defects and their causes, and the cleaning of spray guns.

Objectives	Measures
52.1 Discuss compressors, air transformers, and spray guns.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
52.2 Discuss spraying procedures.	
52.3 Discuss finishing defects and their causes.	
52.4 Discuss the cleaning of spray guns.	
52.5 Demonstrate how to spray-finish a project of your choice.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 53: The learner will describe the characteristics of various finishes used in furniture making.

Objectives	Measures
53.1 Identify types of oil finishes.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
53.2 Describe basic application practice for using oil finishes.	
53.3 Identify basic types of hard-drying finishes.	
53.4 Describe characteristics of various hard-drying finishes.	
53.5 Describe basic surface coating using brushes.	
53.6 Describe basic surface coating using spray equipment.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 54: The learner will define the terms "safety," "accident," and "first aid;" match the six colors of the safety color code with statements of their use; list safety rules; match the three classes of fire with statements defining each class; and identify the safety aspects of hand tools, portable power tools, and woodworking machines.

	Objectives	Measures
54.1	Identify the terms "safety," "accident," and "first aid."	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
54.2	Match three of the colors of the safety color code with statements of their uses.	
54.3	Identify personal and general safety rules.	
54.4	Match the three classes of fire with statements defining each class.	
54.5	Identify the types of dress.	
54.6	Recognize housekeeping characteristics.	
54.7	Identify the safety aspects of hand tools, portable power tools, and woodworking machines.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 55: The learner will identify characteristics employers consider in deciding whom to promote or advance on the job.

Objectives	Measures
55.1 Recognize terms associated with job advancements.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
55.2 Identify characteristics employers consider in deciding whom to promote.	
55.3 Analyze the difference between good and poor attitudes shown on a job.	
55.4 Explain steps that will help in job advancement.	
55.5 Recognize benefits of additional training.	
55.6 Explain reasons why individuals cannot succeed on a job.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 56: The learner will explain the free enterprise system and identify factors that would influence the economy.

Objectives		Measures
56.1	Recognize terms associated with the free enterprise system.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
56.2	Identify resources necessary for production of goods and services.	
56.3	Identify the roles of government in the economy.	
56.4	Identify the roles of individuals and businesses in the economy.	
56.5	Identify the way prices influence the economy.	
56.6	Identify the benefits of competition and profit.	
56.7	Describe ways the government has become involved in the marketplace.	
56.8	Identify reasons why the government's involvement in the economy has increased.	
56.9	Explain problems created due to government involvement in the economy.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 57: The learner will identify the characteristics of a good leader and correctly demonstrate good leadership.

Objectives	Measures
57.1 Describe leadership.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
57.2 Identify characteristics of a good leader.	
57.3 Identify steps one should follow in becoming a good leader.	
57.4 Identify values of having leadership ability.	
57.5 Interpret leadership ability after completing the personality self-rating scale.	
57.6 Recognize leaders within the community and identify traits that make them good leaders.	

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Grade Level: 10-12 Skills/Subject Area: Furniture

COMPETENCY GOAL 58: The learner will preside over business and committee meetings, and identify basic parliamentary practices and procedures in operating a youth club.

Objectives	Measures
58.1 Preside over business and committee meetings.	Refer to competency Test Item Bank VEC-T&I-C/TB 7511, 7512, 7513.
58.2 Perform correctly fourteen steps of parliamentary procedure.	
58.3 Prepare and present a five-minute speech.	
58.4 Make an inventory of assets and liabilities.	
58.5 Keep an up-to-date record book including expenses, receipts, work performed, and a financial statement.	

Graphics and Industrial Communications Outline

1. Work Habits and General Competencies

   a. Performing job tasks
   b. Safety procedure in performing tasks
   c. Good quality of work
   d. Working cooperatively
   e. Work attitudes and behaviors
   f. Working with materials, tools, and equipment
   g. Work area
   h. Personal hygiene and appearance
   i. Communicating ideas
   j. Worker productivity and consumer prices

2. Introduction to Graphic Communication

   a. Historical development of printing process
   b. Major equipment and areas
   c. Occupations and job descriptions
   d. Safety procedure
   e. Legal restrictions of copying
   f. Layout area, tools, and instruments
   g. Basic design principles
   h. Scaling a photograph
   i. Paste-up for a multicolor line reproduction
   j. Copy for halftones, line/halftone combinations, outline halftones, and reverses
   k. Darkroom floor plan
   l. Darkroom set up and line negative
   m. Characteristics of reproduction films
   n. Halftone with dot range
   o. Darkroom safety procedures
   p. Tools and materials of the stripper
   q. Registered flat for simple one-color line and halftone jobs
   r. Registered flat for multi-colored line job
   s. Registered flat for multi-colored job with duotone
   t. Flat production
   u. Flat proofing
   v. Stripping registered four color processes
   w. Materials and processes of the platemaker
   x. Offset plate
   y. Parts of an offset press
   z. Press set up for one-color job
   aa. Press set up for multi-color job
   bb. Press maintenance and adjustments procedures
   cc. Press safety procedures

    - dd. Bindery tools, equipment, and processes
    - ee. Bindery operations
    - ff. Major types of paper
    - gg. Die cutting, scoring, and perforating

3. Leadership

    - a. Characteristics
    - b. Importance of parliamentary procedure
    - c. Correct use of 17 parliamentary procedures
    - d. VICA participation

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Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 1: The learner will follow oral or written instructions for performing job tasks.

Objectives	Measures
1.1 Identify five positive work habits.	Refer to competency Test Item Bank VEC-T&I-C/TB 7791, 7792, 7793.
1.2 Demonstrate the ability to follow oral work related instructions.	
1.3 Demonstrate the ability to follow directions on a "work form."	

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Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 2: The learner will follow prescribed safety procedures in performing tasks.

Objectives	Measures
2.1 Identify safety procedures for the equipment in the GIC lab.	Refer to competency Test Item Bank VEC-T&I-C/TB 7791, 7792, 7793.
2.2 Discuss the importance of housekeeping in the GIC lab.	

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Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 3: The learner will perform work of consistently good quality.

Objectives	Measures
3.1 Demonstrate the ability to recognize acceptable and nonacceptable printing.	Refer to competency Test Item Bank VEC-T&I-C/TB 7791, 7792, 7793.

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Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 4: The learner will function cooperatively with fellow workers and supervisors.

Objectives	Measures
4.1 Discuss the importance of a cooperative attitude with fellow workers.	Refer to competency Test Item Bank VEC-T&I-C/TB 7791, 7792, 7793.
4.2 Discuss the importance of a cooperative attitude with a supervisor.	

Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 5: The learner will demonstrate acceptable work attitudes and behavior.

Objectives	Measures
5.1 Discuss the importance of positive work attitudes.	Refer to competency Test Item Bank VEC-T&I-C/TB 7791, 7792, 7793.
5.2 Discuss the importance of behavior as it relates to safety.	

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Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 6: The learner will handle materials, tools, and equipment in a responsible manner.

Objectives	Measures
6.1 Demonstrate the safe and proper use of materials.	Refer to competency Test Item Bank VEC-T&I-C/TB 7791, 7792, 7793.
6.2 Demonstrate the safe and proper use of tools.	
6.3 Demonstrate the safe and proper use of equipment.	

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Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 7: The learner will maintain work area in an acceptable manner.

Objectives	Measures
7.1 Describe why housekeeping is important to a company.	Refer to competency Test Item Bank VEC-T&I-C/TB 7791, 7792, 7793.
7.2 Demonstrate the ability to logically arrange a printing work area.	

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Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 8: The learner will maintain appropriate personal hygiene and appearance.

Objectives	Measures
8.1 Demonstrate the ability to maintain a clean personal environment.	Refer to competency Test Item Bank VEC-T&I-C/TB 7791, 7792, 7793.
8.2 Select and maintain appropriate clothing.	

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Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 9: The learner will communicate ideas effectively to individuals and/or groups.

Objectives	Measures
9.1 Demonstrate the ability to communicate oral instructions to a group.	Refer to competency Test Item Bank VEC-T&I-C/TB 7791, 7792, 7793.
9.2 Demonstrate the ability to communicate written instructions to a group.	

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Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 10: The learner will interpret the relationship between worker productivity and consumer prices in the free enterprise system.

Objectives	Measures
10.1 Discuss the relationship between worker productivity and consumer prices.	Refer to competency Test Item Bank VEC-T&I-C/TB 7791, 7792, 7793.

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Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 11: The learner will summarize the historical development of the printing processes.

Objectives	Measures
11.1 Identify each reproduction process by matching samples and drawings of the image carrier.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
11.2 Match a list of processes to samples of printed materials.	
11.3 Match a list of names of individuals and events with a list of their contributions to the graphics industry.	

Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 12: The learner will identify major equipment and areas in a graphic communications facility.

Objectives		Measures
12.1	Prepare a scale drawing of the facility showing placement of all equipment and different areas.	Refer to competency Test Item Bank VEC-T&I-C/TB 7791, 7792, 7793.

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Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 13: The learner will identify graphic communications occupations and job descriptions.

Objectives	Measures
13.1 List jobs or operations as they are accomplished on the assembly line.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
13.2 Describe the size and operation of most shops.	
13.3 Recognize the importance of accuracy in the preparation of each operation.	
13.4 Be aware of job opportunities in the graphic communications field and related industries.	
13.5 Identify in writing, sources and locations for graphic communications training in the area.	
13.6 Match the names of graphic communications establishments in the area to the kind of printing done by each facility.	

Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 14: The learner will identify the safety procedures of the graphic industry.

Objectives	Measures
14.1 Make a list of school safety policies and procedures.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
14.2 Prepare a list of graphic communications lab safety procedures.	
14.3 Determine the effects of OSHA on lab facilities.	
14.4 Prepare a scale drawing showing location of fire extinguishers, exit routes, and alarm boxes.	
14.5 Recognize the importance of reporting personal injuries.	

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Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 15: The learner will recognize the legal restrictions of copying.

Objectives	Measures
15.1 Explain the copyright law.	Refer to competency Test Item Bank VEC-T&I-C/TB 7791, 7792, 7793.
15.2 Demonstrate the ability to recognize a copyright statement.	

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Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 16: The learner will identify layout area, tools, and instruments used in the area.

	Objectives	Measures
16.1	Correctly identify tools and materials used in layout and design.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
16.2	Demonstrate ability to properly use tools and instruments.	
16.3	Draw vertical and horizontal lines and measure the lines using a printer's line gauge.	
16.4	Measure the vertical and horizontal lines and report lengths in picas, metric measure, and English standard measure.	

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Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 17: The learner will identify the basic design principles used in graphic communications.

Objectives	Measures
17.1 Identify, from samples, the six major groups of type.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
17.2 Evaluate the use of type styles and design principles.	
17.3 Prepare a series of six layouts using the basic design principles.	
17.4 Describe the purpose of a thumbnail sketch.	
17.5 Develop a rough layout using a thumbnail sketch as a guide.	

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Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 18: The learner will calculate the scaling of a photograph.

Objectives	Measures
18.1 Use the diagonal line method to develop proportion.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
18.2 Calculate proportions using the proportion wheel.	
18.3 Prepare tissue overlays for photos to be scaled and cropped.	

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Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 19: The learner will calculate the number of lines, depth of columns, type face and size, line length, and leading from a given page of typewritten copy and a specimen sheet.

Objectives	Measures
19.1 Compute the number of characters that will fit a given layout.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551. 7552, 7553.
19.2 Mark-up manuscript copy for typesetting with information needed for a typesetter to fit the copy.	

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Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 20: The learner will list the equipment, tools, and materials used in copy preparation.

Objectives		Measures
20.1	Identify methods of hot and cold type composition.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552. 7553.
20.2	Explain how composition is used in copy preparation.	
20.3	Identify advanced copy preparation techniques.	

Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 21: The learner will produce clean type composition.

Objectives	Measures
21.1 Set preprinted dry-transfer type with proper spacing.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
21.2 Set type with a strike-on machine.	
21.3 Set type photographically.	

Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 22: The learner will produce a camera ready paste-up for a single color line reproduction with all the marks needed to assist the stripper and press operator.

Objectives	Measures
22.1 Paste-up all copy elements in their exact positions as shown on the layout.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
22.2 Distinguish between good and poor reproduction copy.	

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Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 23: The learner will produce a camera ready paste-up for a multicolor line reproduction with all the marks needed to assist the stripper and press operator.

Objectives	Measures
23.1 Explain two color spot registration.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
23.2 Use an overlay for a second or third color.	

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Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 24: The learner will produce a camera ready copy for jobs containing halftones, line/halftone combinations, outline halftones, and reverses.

Objectives	Measures
24.1 Define a "reverse." Prepare a tissue overlay with necessary instructions to other production departments.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
24.2 Prepare an overlay for an outline halftone.	
24.3 Prepare a camera ready paste-up with type and neatly cut windows for halftone negatives.	

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Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 25: The learner will match equipment and area of a darkroom floor plan with function.

Objectives	Measures
25.1 Match a list of process camera parts with function.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
25.2 Match a list of contacting equipment with function.	

Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 26: The learner will set up the darkroom and make a line negative using the gray scale.

Objectives	Measures
26.1 Determine the correct exposure time and and f/stop for consistant quality line negatives.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
26.2 Mix both stock and working solutions for processing materials in the reproduction darkroom.	
26.3 Produce acceptable line negatives from problem copy, including colored paper, colored images, and a variety of original line quality.	
26.4 Use simple contacting procedures to produce film duplicated from negatives or positives.	

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Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 27: The learner will describe the characteristics of reproduction films.

Objectives	Measures
27.1 Compare orthochromatic to panchromatic film.	Refer to competency Test Item Bank VEC-T&I-C/TB 7791, 7792, 7793.

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 28: The learner will produce a halftone with acceptable dot range.

Objectives	Measures
28.1 Calibrate and use the graphic arts exposure computer and/or the halftone negative computer for a given contact screen, camera, and film.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
28.2 Produce special effect negatives including: posterizations, duotones, and tone lines.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 29: The learner will prepare a list of darkroom safety procedures.

Objectives	Measures
29.1 Identify safety hazards in the darkroom.	Refer to competency Test Item Bank VEC-T&I-C/TB 7791, 7792, 7793.
29.2 List darkroom safety procedures.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 30: The learner will identify the tools and materials of the stripper.

Objectives	Measures
30.1 Match a list of tools and materials with their proper function.	Refer to competency Test Item Bank VEC-T&I-C/TB 7791, 7792, 7793.

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 31: The learner will produce an accurately registered flat from a properly prepared negative for a single color job.

Objectives	Measures
31.1 Identify two common methods of registration.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
31.2 Identify five types of flats.	

Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 32: The learner will produce an accurately registered flat for a simple one color line and halftone job.

Objectives	Measures
32.1 Describe the difference between line and and halftone copy.	Refer to competency Test Item Bank VEC-T&I-C/TB 7791, 7792, 7793.

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Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 33: The learner will produce an accurately registered flat for a multi-colored line job.

Objectives		Measures
33.1	Explain the difference between flat color and process color.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
33.2	Use a tint screen to produce a multi-colored job.	
33.3	Describe the differences between key-line and close register color.	

Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 34: The learner will produce an accurately registered flat for a multi-colored job with a duotone.

Objectives	Measures
34.1 Explain the production of a duotone.	Refer to competency Test Item Bank VEC-T&I-C/TB 7791, 7792, 7793.

Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 35: The learner will produce a flat using sheetwise (work and back), work and turn, or work and tumble.

Objectives	Measures
35.1 Define imposition as related to image assembly.	Refer to competency Test Item Bank VEC-T&I-C/TB 7791, 7792, 7793.

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12

Skills/Subject Area: GIC

COMPETENCY GOAL 36: The learner will proof a flat.

Objectives	Measures
36.1 Describe the differences between silverprint, brownline, dylux, and blueprint.	Refer to competency Test Item Bank VEC-T&I-C/TB 7791, 7792, 7793.

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TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 37: The learner will strip a set of registered four color process negatives or positives.

Objectives	Measures
37.1 Describe the four color process.	Refer to competency Test Item Bank VEC-T&I-C/TB 7791, 7792, 7793.
37.2 List the steps involved in stripping.	

Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 38: The learner will identify the materials and processes of the platemaker.

Objectives		Measures
38.1	Explain the differences between paper, metal, and bi-metal offset plates.	Refer to competency Test Item Bank VEC-T&I-C/TB 7791, 7792, 7793.

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TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10+12 Skills/Subject Area: GIC

COMPETENCY GOAL 39: The learner will expose and process an offset plate.

Objectives	Measures
39.1 Determine the correct exposure time of an offset plate using a gray scale and the plate manufacturer's specifications.	Refer to competency Test Item Bank VEC-T&I-C/TB 7791, 7792, 7793.

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TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 40: The learner will identify the parts of an offset press.

Objectives	Measures
40.1 Discuss the press paper feeding system.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
40.2 Discuss the inking system of the press.	
40.3 Discuss the press water foundation and dampening system.	
40.4 Discuss the paper receiving end of the press.	

Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 41: The learner will set up the press and run a clean, registered one color job.

Objectives	Measures
41.1 Rerun fifteen copies for registration.	Refer to competency Test Item Bank VEC-T&I-C/TB 7791, 7792, 7793.

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 42: The learner will set up the press and run a multi-colored job.

Objectives	Measures
42.1 Match corrective measures to related press, paper, and ink problems.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
42.2 Mix press fountain solution to specifications.	
42.3 Mix and match ink to proper applications.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 43: The learner will perform standard maintenance and adjustment procedures on the press including: lubrication, blanket replacement, roller replacement, dampener replacement, adjustments, and cleaning.

Objectives	Measures
43.1 List the steps required to perform maintenance and adjustment procedures on the press.	Refer to competency Test Item Bank VEC-T&I-C/TB 7791, 7792, 7793.
43.2 Perform standard maintenance and adjustment procedures on the press.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 44: The learner will outline the standard safety procedures for the press in use.

Objectives	Measures
44.1 List the standard safety procedures for press use.	Refer to competency Test Item Bank VEC-T&I-C/TB 7791, 7792, 7793.
44.2 Demonstrate the safe use of a press.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 45: The learner will identify the tools, equipment, and processes of the bindery.

Objectives	Measures
45.1 Identify major types of bindery operations.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
45.2 Explain three different types of binding used to bind books.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 46: The learner will define bindery operations.

Objectives	Measures
46.1 Make a pad from loose sheets of paper.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
46.2 Assemble signatures and cover in the proper order to make a booklet. a. Set up the folder and fold signatures. b. Saddle stitch the signatures and cover. c. Jog and trim booklets.	
46.3 Cut paper for a particular job. a. Explain the steps in calculating paper cuts. b. Explain the importance of paper grain and job planning.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 47: The learner will identify major types of paper.

Objectives	Measures
47.1 Describe characteristics of paper.	Refer to competency Test Item Bank VEC-T&I-C/TB 7791, 7792, 7793.

Grade Level: 10-12 Skills/Subject Area: GIC

COMPETENCY GOAL 48: The learner will describe die cutting, scoring, and perforating.

Objectives	Measures
48.1 List the procedures for die cutting, scoring, and perforating.	Refer to competency Test Item Bank VEC-T&I-C/TB 7791, 7792, 7793.
48.2 Perform the procedures for die cutting, scoring, and perforating.	

Industrial Cooperative Training Outline

1. Orientation

    a. History of vocational education
    b. Description of ICT
    c. Characteristics of VICA
    d. Legal aspects of employment
    e. Social Security Services
    f. Pay voucher deductions

2. Job Related Information

    a. Technical information
    b. Satisfactory employment

3. Employment

    a. Factors that affect working environment
    b. Procedures in securing employment
    c. Success and achievement
    d. Jobs compatible with lifestyle

4. Industrial Safety and First Aid

    a. Importance of safety and accident prevention
    b. Hazards of fires in industry
    c. Role of Safety and Health Administration
    d. Developing safe working conditions
    e. Basic principles of first aid

5. American Industrial System

    a. Basic characteristics of the economic system
    b. Factors that affect American business and industry
    c. Economic principles of scarcity
    d. Effects of technological advances
    e. Organized labor
    f. Factors of starting your own business.

6. Supervision

    a. Fundamentals of leadership
    b. Fundamentals of followership
    c. Role of first-line supervisor

7. Leadership
    a. Characteristics
    b. Importance of parliamentary procedure
    c. Correct use of 17 parliamentary procedures
    d. VICA participation

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: ICT

COMPETENCY GOAL 1: The learner will summarize a brief history of vocational education.

Objectives	Measures
1.1 Show awareness of key national vocational acts.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
1.2 Identify the purposes of vocational education.	
1.3 Identify the formal division of vocational education.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: ICT

COMPETENCY GOAL 2: The learner will describe Industrial Cooperative Training.

Objectives	Measures
2.1 Summarize a history of ICT.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
2.2 Recognize the purposes of ICT.	
2.3 Identify the key elements of a cooperative training program.	
2.4 Recognize student preformance evaluation criteria.	
2.5 Identify the terminology used in the ICT program.	
2.6 Describe the necessary records and forms used in the ICT program.	
2.7 Actively participate in recordkeeping.	
2.8 Describe the difference between general and technical (job-related) information taught in the ICT program.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: ICT

COMPETENCY GOAL 3: The learner will identify the characteristics of the Vocational Industrial Clubs of America (VICA).

Objectives	Measures
3.1 Summarize the purposes of VICA.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
3.2 Identify the tenets of VICA.	
3.3 Identify the value of the vocational initiative and club achievement program.	
3.4 Develop a standard order of business for a VICA meeting.	
3.5 Actively participate in a club meeting.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: ICT

COMPETENCY GOAL 4: The learner will identify legal aspects of employment.

Objectives	Measures
4.1 Recognize the seventeen hazardous occupations.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
4.2 Recognize the conditions of employment in a hazardous occupation.	
4.3 Recognize the wage and hour limitations for minors according to North Carolina labor laws.	
4.4 Recognize the conditions which qualify a person for unemployment insurance.	
4.5 Recognize the conditions which qualify a person for workers' compensation.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: ICT

COMPETENCY GOAL 5: The learner will show awareness of Social Security Services.

Objectives	Measures
5.1 Recognize the need for Social Security.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
5.2 Recognize the four Social Security benefits.	
5.3 Identify the two parties which finance Social Security.	
5.4 Recognize the application of the Social Security Card.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: ICT

COMPETENCY GOAL 6: The learner will describe deductions on the pay voucher.

Objectives	Measures
6.1 Identify the areas of deductions on the pay voucher.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
6.2 Discuss why deductions are necessary.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: ICT

COMPETENCY GOAL 7: The learner will show an awareness of technical information related to her/his job.

Objectives	Measures
7.1 Recognize sources of information related to her/his job.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
7.2 Recognize terminology used on the job.	
7.3 Identify tools and equipment used on the job.	
7.4 Describe skills performed on the job.	
7.5 Identify materials used on the job.	
7.6 Perform job related mathematical skills.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: ICT

COMPETENCY GOAL 8: The learner will engage in satisfactory employment in a legitimate ICT training station.

Objectives	Measures
8.1 Develop, under coordinator's supervision, a training plan for a legitimate ICT job.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
8.2 Perform tasks listed in training plan in accordance with employer's standards.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: ICT

COMPETENCY GOAL 9: The learner will identify factors that affect the working environment.

Objectives	Measures
9.1 Identify what an employer expects from the employee.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
9.2 Identify what an employee expects from the employer.	
9.3 Describe the importance of a positive attitude.	
9.4 Identify responsibilities to other employees.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: ICT

COMPETENCY GOAL 10: The learner will recognize procedures in securing employment.

	Objectives	Measures
10.1	Describe the sources for locating employment.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
10.2	Develop a letter of application.	
10.3	Develop a personal data sheet (or resume).	
10.4	Transcribe information from data sheet to employment application.	
10.5	Demonstrate job interview techniques.	
10.6	Evaluate a company for possible employment.	

Grade Level: 10-12 Skills/Subject Area: ICT

COMPETENCY GOAL 11: The learner will evaluate success and achievement on the job.

Objectives	Measures
11.1 Show awareness of those characteristics necessary for job success.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
11.2 Describe the importance of employee evaluation by the employer.	
11.3 Describe the proper procedures for terminating employment.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: ICT

COMPETENCY GOAL 12: The learner will recognize jobs compatible with her/his lifestyle.

	Objectives	Measures
12.1	Show awareness of job(s) compatible with her/his needs, interests, and abilities.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
12.2	Identify job opportunities available in identified occupations.	
12.3	Show an awareness of employment potential in various identified occupations.	
12.4	Determine short- and long-range goals as they relate to a given occupation.	

Grade Level: 10-12 Skills/Subject Area: ICT

COMPETENCY GOAL 13: The learner will analyze the importance of safety and accident prevention.

Objectives	Measures
13.1 Describe the importance of accident prevention.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
13.2 Recognize various causes of accidents.	
13.3 Identify specific health hazards in industry.	
13.4 Recognize potential situations where accidents can occur.	
13.5 Interpret information regarding the costs of accidents to the individual and the employer.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: ICT

COMPETENCY GOAL 14: The learner will identify the hazards of fires in industry.

Objectives	Measures
14.1 Identify the sources of fires in industry.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
14.2 Identify the types or classes of fires.	
14.3 Identify the methods of controlling fires.	

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Grade Level: 10-12 Skills/Subject Area: ICT

COMPETENCY GOAL 15: The learner will describe the role of the Occupational Safety and Health Adminstration.

Objectives	Measures
15.1 Recognize the objectives of OSHA.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
15.2 Identify the responsibility of the employer as outlined in OSHA.	
15.3 Describe the responsibility of the employee.	
15.4 Identify employee rights under OSHA.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: ICT

COMPETENCY GOAL 16: The learner will describe practices to develop safe working conditions.

	Objectives	Measures
16.1	Show an awareness of safe housekeeping practices on the job.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
16.2	Describe routine maintenance procedures to insure safe working conditions.	
16.3	Identify safe machine operation techniques.	
16.4	Demonstrate safe handling procedures for heavy objects.	
16.5	Demonstrate safe practices in the use of hand tools.	
16.6	Describe safe practices in using electricity.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: ICT

COMPETENCY GOAL 17: The learner will identify basic principles of first aid.

Objectives	Measures
17.1 Describe steps in handling an emergency.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
17.2 Recognize classes of wounds.	
17.3 Show an awareness of treatment for wounds.	
17.4 Describe the three types of bleeding.	
17.5 Demonstrate methods of controlling bleeding.	
17.6 Demonstrate mouth-to-mouth artificial respiration.	
17.7 Recognize the types of fractures.	
17.8 Demonstrate the treatment for broken bones.	
17.9 Identify the classes of burns.	
17.10 Demonstrate the treatments for shock.	
17.11 Demonstrate proper techniques of bandaging.	
17.12 Demonstrate methods of transporting the injured.	

Grade Level: 10-12

Skills/Subject Area: ICT

COMPETENCY GOAL 17: The learner will identify basic principles of first aid.

Objectives	Measures
17.13 Identify types of heat ailments.	
17.14 Describe the treatment for victims of poisons.	

Grade Level: 10-12 Skills/Subject Area: ICT

COMPETENCY GOAL 18: The learner will analyze the basic characteristics of the economic system in the United States.

Objectives		Measures
18.1	Identify the basic types of economic systems.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
18.2	Evaluate private property.	
18.3	Evaluate profit motivation.	
18.4	Evaluate competition.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: ICT

COMPETENCY GOAL 19: The learner will show an awareness of basic factors that effect American business and industry.

Objectives		Measures
19.1	Recognize the participants in the free enterprise system.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
19.2	Summarize the classifications of business in the United States.	
19.3	Explain economic cycles.	
19.4	Evaluate effects of international trade on the American industrial system.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: ICT

COMPETENCY GOAL 20: The learner will show an awareness of the basic economic principles of scarcity.

Objectives	Measures
20.1 Identify the three basic economic questions of scarcity.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
20.2 Evaluate the factors of production.	
20.3 Analyze the law of supply and demand.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: ICT

COMPETENCY GOAL 21: The learner will describe the effects of technological advance as it affects the employee.

Objectives	Measures
21.1 Recognize changes in the standard of living.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
21.2 Interpret specialization as it would affect employees.	

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TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: ICT

COMPETENCY GOAL 22: The learner will show an awareness of organized labor.

Objectives		Measures
22.1	Explain the purpose of the union.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
22.2	Describe the history of the labor movement in the United States.	
22.3	Evaluate the positive aspects of labor unions.	
22.4	Evaluate the negative aspects of the labor unions.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12　　Skills/Subject Area: ICT

COMPETENCY GOAL 23: The learner will show an awareness of basic factors of starting her/his own business.

Objectives	Measures
23.1 Describe the basic problems relating to small business.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
23.2 Explain the basic elements of operating a small business.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: ICT

COMPETENCY GOAL 24: The learner will summarize the fundamentals of leadership.

Objectives	Measures
24.1 Describe leadership.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
24.2 Recognize types of leaders.	
24.3 Recognize basic styles of leadership prevalent in industry.	
24.4 Identify leadership abilities.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: ICT

COMPETENCY GOAL 25: The learner will show an appreciation for the ability to take direction, orders and instructions.

Objectives	Measures
25.1 Describe the ability to do what a leader, superior, or teacher instructs.	**Refer to competency** Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
25.2 Identify those characteristics which facilitate taking directions and orders.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: ICT

COMPETENCY GOAL 26: The learner will summarize the role of the first-line supervisor.

Objectives	Measures
26.1 Identify the supervisor's key functions and responsibilities.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
26.2 Demonstrate communication skills used by supervisor and/or employee.	

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Machine Shop Outline

1. Orientation to Machine Trades
    a. Identification
    b. Requirements

2. Safety and Shop Practices
    a. Work habits and behavior
    b. Attitude towards safety
    c. Accident prevention and cause
    d. Fire prevention and cause
    e. Procedures to follow in case of accidents
    f. Identification of first aid procedures
    g. Practices used when handling oils, acids, and flammable gases

3. Machine Maintenance
    a. Identification of problems
    b. Types of lubrication systems and components
    c. Routine maintenance

4. Mathematics
    a. Basic and advanced operations
    b. Basic and advanced algebra
    c. Basic and advanced geometry
    d. Basic and advanced trigonometry

5. Blueprint Reading and Sketching
    a. Determination of dimensions, specifications, and shop procedures by reading a blueprint
    b. Specifications

6. Measuring
    a. Identification and description of semiprecision, precision, and metric measuring tools
    b. Demonstration of use of tools
    c. Use of transfer tools
    d. Use of precision measuring tools

7. Layout and Inspection
    a. Procedure for layout of work pieces
    b. Inspection of materials for specifications
    c. Characteristics and properties used
    d. Shapes of ferrous and nonferrous materials
    e. Types of cutting fluids and application

8. Bench Work

    a. Identification, purpose, and application of power tools
    b. Safety hazards
    c. Operation of hand and portable power tools
    d. Use of specialized hand tools

9. Fasteners

    a. Functions of common fasteners
    b. Identification of nonhardware fastening systems

10. Sawing

    a. Identification of cutoff saws and description
    b. Construction, description, and application of saws
    c. Maintenance procedures

11. Drilling

    a. Identification, characteristics, procedures
    b. Tool holding devices

12. Turning

    a. Identification and processes
    b. Construction of engine lathe
    c. Construction, function of turret lathe

13. Shaping and Planing

    a. Identification, application
    b. Components and functions of shaper, planer

14. Milling

    a. Types of milling machines
    b. Components/accessories of horizontal milling machine
    c. Components/accessories of vertical milling machine.

15. Grinding

    a. Identification of parts and pedestal grinders
    b. Identification of precision grinding processes
    c. Components and accessories of surface grinder
    d. Safe performance operation
    e. Components and functions of centerless grinder
    f. Set up and performance
    g. Components and function of cylindrical grinder

   - h. Performance of operations
   - i. Components, functions of tool and cutter grinder
   - j. Safe set up and use of tool and cutter grinder
   - k. Lapping and performing lapping operations
   - l. Honing operations

16. Special Processes

    a. Function and use of a profiler or pantograph
    b. Types of numerical control systems
    c. Numerical control system
    d. Use of electrical discharge machine

17. Metallurgy

    a. Application, purpose of heat treatment process
    b. Purpose of hardness testing, tensile testing

18. Welding

    a. Identification of oxyacetylene welding
    b. Arc welding joining processes

19. Communications

    a. Listening skills
    b. Oral instructions in performing job task

20. Leadership

    a. Characteristics of a good leader
    b. Importance of parliamentary procedure
    c. Correct use of 17 parliamentary procedures
    d. VICA participation

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Machine Shop

COMPETENCY GOAL 1: The learner will identify the machine trades' occupational opportunities and requirements.

Objectives	Measures
1.1 Define the terminology related to machine trades and machine shop.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
1.2 Identify the major occupations in the machine trades.	
1.3 List six job classifications in the machine trades and describe learning and working conditions.	
1.4 List six sources of information on job placement and job outlook in the machine trades.	
1.5 Identify and describe educational requirements for entering machine trades.	
1.6 Describe types of machine shops and shop operations.	
1.7 Interpret the relationship between worker productivity and consumer prices in a free enterprise system.	

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COMPETENCY GOAL 2: The learner will demonstrate acceptable work habits and behavior.

Objectives	Measures
2.1 Explain shop procedures and practices.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
2.2 Work cooperatively with fellow students and supervisors.	
2.3 Handle materials, tools, and equipment in a responsible manner.	
2.4 Maintain work area in an acceptable manner.	
2.5 Maintain appropriate personal hygiene and appearance.	
2.6 Identify and describe the types of reference materials used in the machine shop.	
2.7 Perform work of consistently good quality.	

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COMPETENCY GOAL 3: The learner will demonstrate positive attitudes towards safety by following rules for personal safety.

Objectives	Measures
3.1 Explain shop rules related to safety.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
3.2 Follow prescribed safety procedures in performing job tasks.	
3.3 Wear appropriate personal protective equipment consistently.	
3.4 Follow correct procedures for lifting.	
3.5 Wear eye protection on the job.	
3.6 Explain procedures to avoid infection when handling oils, greases, and solvents.	
3.7 Describe electrical hazards in a machine shop, and explain safe practices to be observed.	

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COMPETENCY GOAL 4: The learner will identify the causes of accidents and describe accident prevention practices to be observed.

Objectives	Measures
4.1 Define the terms "accident," "accident prevention," and "hazard analysis."	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
4.2 Explain safety procedures to be observed when working in a machine shop.	
4.3 Explain OSHA regulations as they apply to machine shop practices.	
4.4 Identify the basic safety colors and explain their applications.	
4.5 Identify the procedures to be followed in event of an accident in the shop.	
4.6 Identify the steps in maintaining a clean and orderly shop and explain their importance to safety.	

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COMPETENCY GOAL 5: The learner will identify the causes of fires, and describe methods of preventing, and extinguishing them.

Objectives	Measures
5.1 Explain the theory of combustion.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
5.2 Distinguish between the different causes of fire.	
5.3 Explain the construction and use of pressurized water, CO_2, foam, dry chemical and ABCD fire extinguishers.	
5.4 Identify the type of extinguisher needed to control specific types of fires, and their location in the shop.	
5.5 Operate a fire extinguish effectively.	
5.6 Explain the procedures for evacuation of the shop facility, and the procedure for notifying the proper authorities in case of fire.	

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COMPETENCY GOAL 6: The learner will identify and explain procedures to be followed in case of an accident in the shop.

Objectives	Measures
6.1 Locate major electrical cut-offs (e.g., circuit breakers.)	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
6.2 Explain procedures for informing instructor, administration, and appropriate authorities.	
6.3 Locate gas, water, and lighting cut-off points.	
6.4 Describe emergency exit procedure.	
6.5 Locate first aid material and supplies.	

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COMPETENCY GOAL 7: The learner will identify and describe first aid procedures.

Objectives		Measures
7.1	Explain first aid procedures for electrical shock.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
7.2	Explain how to stop blood flow in small wounds.	
7.3	Explain the procedure for identifying and aiding a shock victim.	
7.4	Explain the use and location of the eye wash basin.	
7.5	Explain the procedure for treating acid spills, and/or burns.	
7.6	Explain the procedure for giving mouth to mouth resuscitation.	
7.7	Explain the procedure for administering CPR to a suspected heart attack victim.	

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COMPETENCY GOAL 8: The learner will identify safe practices to be used when handling oils, acids, fluxes, and flammable gases.

Objectives	Measures
8.1 List the safety procedures to be used for handling oils.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
8.2 List the safety procedures to be used for handling acids.	
8.3 List the safety procedures to be used for handling fluxes.	
8.4 List the safety procedures to be used for handling flammable gases.	

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COMPETENCY GOAL 9: The learner will identify and describe the most common machine maintenance problems.

Objectives	Measures
9.1 Identify common machine maintenance problems.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
9.2 Describe common machine maintenance problems.	

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COMPETENCY GOAL 10: The learner will describe types of lubrication systems and their components.

Objectives	Measures
10.1 Explain the theories of lubrication.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
10.2 Describe characteristics of different types of lubricants.	
10.3 Locate specifications, and/or reference materials related to lubrication.	

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COMPETENCY GOAL 11: The learner will perform routine maintenance.

Objectives	Measures
11.1 Lubricate machines according to manufacturer's specifications.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
11.2 Make routine repairs on machines according to manufacturer's specifications.	
11.3 Make major repairs on machines according to manufacturer's specifications.	

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COMPETENCY GOAL 12: The learner will perform basic and advanced arithmetic operations.

Objectives	Measures
12.1 Add, subtract, multiply, and divide fractions, and decimal equivalents.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
12.2 Change fractions to lowest common denominator.	
12.3 Reduce fractions to lowest terms.	
12.4 Convert fractions to decimal equivalents.	
12.5 Interpret a decimal equivalent chart.	

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COMPETENCY GOAL 13: The learner will perform basic and advanced algebra problems.

Objectives	Measures
13.1 Solve problems involving tapers.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.

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COMPETENCY GOAL 14: The learner will perform basic and advanced geometry problems.

Objectives	Measures
14.1 List geometric problems that will be utilized in machine shop layout.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
14.2 Solve basic and advanced geometrical construction problems.	

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COMPETENCY GOAL 15: The learner will perform basic and advanced trigonometry problems.

Objectives	Measures
15.1 Solve problems involving sine bar problems.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.

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COMPETENCY GOAL 16: The learner will determine by reading a blueprint, dimensions, tolerances, specifications, and shop procedures necessary to complete a part by reading a blueprint.

Objectives	Measures
16.1 Fabricate a part by using a blueprint for specifications.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.

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COMPETENCY GOAL 17: The learner will sketch a part for machining or fabrication using necessary views, specifications, limits, tolerances, and shop notes to provide all necessary information.

Objectives	Measures
17.1 Develop a shop sketch of a part using orthographic projections.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
17.2 Properly note all standard specification notes and procedures.	

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COMPETENCY GOAL 18: The learner will identify and describe the application of semiprecision, precision, and metric measuring tools in the machine trades.

Objectives		Measures
18.1	Identify the five types of rules used in the machine trades for linear measurement, and describe their applications.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
18.2	Identify the types of measuring tools used to transfer measurements, and describe their applications.	
18.3	Identify the precision and metric measuring tools used in the machine shop, and describe their applications.	

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COMPETENCY GOAL 19: The learner will demonstrate the use of semiprecision measuring tools in shop operations.

Objectives	Measures
19.1 Measure lines of a specific length to a precise dimension using a bench rule or machinist's scale.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
19.2 Measure inside and outside diameters using a caliper rule.	
19.3 Measure depths of grooves, recesses, and shoulders using a depth rule.	
19.4 Measure drill point angles, key set lengths, and degrees, and locate center points on round work pieces, using rules and accessories.	
19.5 Measure radii with a radius gage.	

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COMPETENCY GOAL 20: The learner will demonstrate the use of transfer tools in shop operations.

Objectives	Measures
20.1 Transfer measurements using appropriate rules, inside and outside calipers, and dividers.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.

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COMPETENCY GOAL 21: The learner will demonstrate the use of precision measuring tools in machine shop operations.

Objectives	Measures
21.1 Measure diameters, thickness, and short lengths using an outside micrometer.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
21.2 Measure inside diameters using inside micrometers, dial indicators, or telescoping gages in conjunction with appropriate precision measuring tools.	
21.3 Measure height, thickness, length, width, and outside diameters of stock, using vernier gages and a surface plate.	
21.4 Check the accuracy of dial indicators and micrometers using precision gage blocks.	
21.5 Measure stock using dial vernier calipers and vernier height gages.	
21.6 Measure threads with a thread gage.	
21.7 Measure surface finish.	

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COMPETENCY GOAL 22: The learner will determine the appropriate procedure for layout of a variety of work pieces. Prepare the stock and layout the work and machining.

Objectives	Measures
22.1 Prepare stock for layout.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
22.2 Select the correct layout tools and equipment.	
22.3 Make a precision layout on selected work pieces.	
22.4 Inspect the layout for accuracy using precision layout and measuring tools.	

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COMPETENCY GOAL 23: The learner will inspect materials and parts for flaws, and finished parts for dimensional specifications and tolerances, using inspection and test equipment.

Objectives	Measures
23.1 Select appropriate inspection equipment, and locate and identify cracks and/or material flaws in materials or finished parts.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
23.2 Inspect finished parts for dimensional tolerances, surface finish, and adherance to specifications, using appropriate test and inspection equipment.	

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COMPETENCY GOAL 24: The learner will identify, test, and describe the characteristics and properties used in the machine trades.

Objectives	Measures
24.1 Define the terms "ferrous" and "nonferrous" as related to metals used in the machine trades.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
24.2 Identify ferrous metals by spark test, finish, and color code.	
24.3 Identify nonferrous materials by magnetic test, color code, material appearance, and lathe chip test.	
24.4 Identify and describe the basic ferrous alloys, and the effect of alloying elements.	
24.5 Identify the ANSI and SAE numbering systems.	
24.6 Identify the commonly used nonferrous materials used in the machine trades-describe their basic properties and characteristics.	
24.7 Identify the alloying elements used in nonferrous materials, and describe the effect of these alloying elements.	
24.8 Define the Aluminum Association Number System for physical, quality, and heat treatment designations.	

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COMPETENCY GOAL 25: The learner will identify shapes of ferrous and nonferrous materials used in the machine trades.

Objectives	Measures
25.1 List three major types of ferrous and nonferrous material shapes, and the processes used to produce them.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
25.2 Describe methods used to finish ferrous and nonferrous materials.	

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COMPETENCY GOAL 26: The learner will identify the basic types of cutting fluids used in machine trades operations and their application.

Objectives	Measures
26.1 Identify the basic types of cutting fluids.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
26.2 Describe the proper procedures for using cutting fluids.	

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COMPETENCY GOAL 27: The learner will identify the basic hand and power tools used in bench work in the machinist trades, and describe their purpose and application.

Objectives	Measures
27.1 List the basic hand tools and their purpose.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
27.2 List the basic power tools and their purpose.	

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COMPETENCY GOAL 28: The learner will identify safety hazards in using basic hand tools, and explain safe operating practices.

Objectives	Measures
28.1 Identify and describe the correct use of of striking tools.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
28.2 Identify and/or describe the correct use of hand cutting tools used in the machine trades.	
28.3 Identify and describe the correct use of hand chipping and gouging tools used in the machines trades.	

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COMPETENCY GOAL 29: The learner will demonstrate the correct and safe operation of hand and portable power tools used in the machine trades.

Objectives	Measures
29.1 Cut and finish materials to size using hand hack saws and files.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
29.2 Select twist drills, center work, and drill holes as located, using a portable power drill.	
29.3 Prepare stock, and cut internal and external threads with hand taps and dies.	
29.4 Select correct hand reamers and finish holes to specified size.	
29.5 Chip surfaces and gouge materials as required using appropriate hand tools.	

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COMPETENCY GOAL 30: The learner will demonstrate the correct use of specialized hand tools used in the machine trades.

Objectives		Measures
30.1	Prepare stock, select the correct broach, and broach work pieces to given specifications.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
30.2	Polish work pieces to given specifications.	
30.3	Identify or mark work pieces by hand stamping or etching.	
30.4	Select correct hand tools and extract screws, taps, bolts, or studs.	

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COMPETENCY GOAL 31: The learner will identify and describe the functions of common fasteners.

Objectives	Measures
31.1 Identify factors used in sizing and classification of common fasteners.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
31.2 Select correct fasteners as specified.	
31.3 Identify and demonstrate nonhardware fastening systems (i.e., press fit).	

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COMPETENCY GOAL 32: The learner will identify the various types of power cutoff saws and describe their functions and applications.

Objectives	Measures
32.1 Identify safety hazards in using cutoff saws and explain safe operating practices.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
32.2 Describe the construction and applications of reciprocating hacksaws and continuous band, and abrasive cutoff saws.	
32.3 Prepare stock, select and install the correct blade, set the feed and speed, and clamp work correctly for cutting on the reciprocating or continuous band saws.	
32.4 Make straight and angular cuts to specifications using reciprocating or continuous band cutoff saws.	
32.5 Prepare stock, securely clamp work, and cut off stock safely using the abrasive cutoff machine.	

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COMPETENCY GOAL 33: The learner will describe the construction, component parts, and application of vertical or contour saws in machine shop operations.

Objectives		Measures
33.1	Identify safety hazards in using vertical or contour saws in machine shop operations.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
33.2	Identify and describe the major parts, controls, clamping devices, and accessories on vertical or contour saws.	
33.3	Select and install the correct blade, set the appropriate feed and speed, and cut any piece to given specifications.	
33.4	Select the correct band or blade for friction cutting or filing, and cut or file any given piece to specifications.	

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COMPETENCY GOAL 34: The learner will demonstrate correct procedures of maintenance of cutoff and contour saws.

Objectives		Measures
34.1	Identify safety hazards in using cutoff and and contour saws.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
34.2	Set guides as required.	
34.3	Weld band saw blades from stock rolls.	
34.4	Coil and store bands.	

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COMPETENCY GOAL 35: The learner will identify the major types of drilling machines, describe their characteristics, operating procedures, and applications; and demonstrate skills in setup and performing drilling operations.

Objectives	Measures
35.1 Identify safety hazards in using drilling machines, and describe safe operating practices.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
35.2 Calculate cutting speeds and feeds for different drilling, tapping, threading, lapping, and honing operations.	
35.3 Select the correct drill for a given work problem, prepare the work, select work holding devices, and drill a hole in a specific location.	
35.4 Prepare a work piece, locate it, clamp it with correct work hold devices, and ream it to specifications.	
35.5 Select correct work and tool holding devices, and tap a hole to given specifications.	

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COMPETENCY GOAL 36: The learner will identify the major turning processes and turning machines.

Objectives	Measures
36.1 Identify and/or describe the major turning processes and their applications (e.g., straight turning, facing, taper turning, knurling, drilling, reaming, boring, threading).	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
36.2 Identify and describe the major types of turning machines used in industrial operations.	

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Grade Level: 10-12 Skills/Subject Area: Machine Shop

COMPETENCY GOAL 37: The learner will describe the construction, parts, and accessories of the engine lathe and explain their function. Demonstrate skill in performing lathe operations.

Objectives		Measures
37.1	Identify safety hazards in using the engine lathe, and explain safe operating practices.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
37.2	Identify and describe engine lathe components.	
37.3	Identify and describe common attachments and accessories for the engine lathe.	
37.4	Determine rpm's and feeds appropriate to the lathe operation being performed.	
37.5	Grind lathe tools which conform to standard styles.	
37.6	Set up work on the engine lathe using the basic holding devices (e.g., four jaw chuck, three jaw chuck, collet, face plate, and between centers).	
37.7	Demonstrate the processes of facing, straight turning, and taper turning, by working to specifications.	
37.8	Demonstrate skills in the special processes of grinding, knurling, drilling, reaming, boring, and threading, by finishing work to specifications.	

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COMPETENCY GOAL 38: The learner will describe the construction, parts, and accessories of the turret lathe and explain their function. Demonstrate skills in performing turret lathe operations.

Objectives		Measures
38.1	Identify safety hazards in using the turret lathe and explain safe operating practices.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
38.2	Identify types of tool holders and tools.	
38.3	Plan a job sequence for the turret lathe.	
38.4	Set up and/or adjust the turret lathe for a specified job sequence.	
38.5	Perform drilling, reaming, boring, and cutoff operations.	
38.6	Set up and use a geometric die level.	
38.7	Set up and use a collapse tap.	
38.8	Set up a feed bar.	

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Grade Level: 10-12 Skills/Subject Area: Machine Shop

COMPETENCY GOAL 39: The learner will identify types of shapers and planers used in industrial operations as well as their applications and basic construction.

Objectives	Measures
39.1 Identify and describe basic processes performed on the shaper and the planer.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
39.2 Describe the major differences between the shaper and the planer.	

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COMPETENCY GOAL 40: The learner will describe the components and functions of shapers and planers. Demonstrate skills in setting up and performing shaping and planing operations to specifications.

Objectives	Measures
40.1 Identify safety hazards in operating the shaper and the planer, and explain safe operating practices.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
40.2 Identify and describe shaper and planer components.	
40.3 Determine strokes per minute, and feeds appropriate to shaper/planer operations being performed.	
40.4 Grind shaper/planer tools which conform to standard styles.	
40.5 Set up, and shape or plane, a horizontal surface.	
40.6 Set up, and shape or plane, a vertical surface.	
40.7 Set up, and shape or plane, a contour to a layout line.	
40.8 Set up, and shape or plane, an angular surface.	
40.9 Set up and use an index head in a shaping or planing operation.	

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Grade Level: 10-12 Skills/Subject Area: Machine Shop

COMPETENCY GOAL 41: The learner will identify the types of milling machines used in industrial operations, and describe their applications and basic construction.

Objectives	Measures
41.1 Describe the milling processes performed on the horizontal and vertical mill.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
41.2 Describe the differences between the horizontal and vertical milling operations.	

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Grade Level: 10-12 Skills/Subject Area: Machine Shop

COMPETENCY GOAL 42: The learner will describe the basic components and accessories of the horizontal milling machine. Explain their function and demonstrate skills in setting up and performing horizontal milling machine operations to specifications.

Objectives	Measures
42.1 Identify safety hazards in using the horizontal milling machine, and explain safe operating practices.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
42.2 Identify and describe the functions of the horizontal milling machine components.	
42.3 Identify and describe the use of horizontal milling machine accessories.	
42.4 Calculate correct rpm and feed rates.	
42.5 Select correct speed and feed rates for specified problems.	
42.6 Set up and align work holding devices on the horizontal milling machine.	
42.7 Mount cutters and arbor properly on the horizontal milling machine.	
42.8 Set up the horizontal milling machine, sill slots, slat mill, face mill, side mill, and straddle or gang mill work pieces according to specifications.	
42.9 Calculate for set up and mill gears.	

Grade Level: 10-12

Skills/Subject Area: Machine Shop

COMPETENCY GOAL 42: The learner will describe the basic components and accessories of the horizontal milling machine. Explain their function and demonstrate skills in setting up and performing horizontal milling machine operations to specifications.

Objectives	Measures
42.10 Demonstrate skills in drilling and reaming on the horizontal mill.	
42.11 Demonstrate the correct use of the rotary table and the index head.	

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Grade Level: 10-12 Skills/Subject Area: Machine Shop

COMPETENCY GOAL 43: The learner will describe the components and accessories of the vertical milling machine. Explain their function, and demonstrate skills in setting up and performing vertical milling machine operations to specifications.

Objectives	Measures
43.1 Identify safety hazards in using the vertical milling machine, and explain safe operating practices.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
43.2 Identify and describe the functions of the vertical milling components.	
43.3 Calculate feeds and speeds for specific vertical milling machine operations.	
43.4 Align the head of the vertical mill perpendicular to the table.	
43.5 Mount cutters in collets and end mill holders.	
43.6 Set up and demonstrate a slotting attachment.	
43.7 Set up and demonstrate right angle attachments.	
43.8 Set up and demonstrate side milling operations.	
43.9 Set up and demonstrate end milling operations.	
43.10 Set up and demonstrate dovetail milling.	

Grade Level: 10-12

Skills/Subject Area: Machine Shop

COMPETENCY GOAL 43: The learner will describe the components and accessories of the vertical milling machine. Explain their function, and demonstrate skills in setting up and performing vertical milling machine operations to specifications.

Objectives	Measures
43.11 Set up and demonstrate slotting operations.	
43.12 Set up and demonstrate performing oil drilling, reaming, and boring operations.	
43.13 Set up and demonstrate grooves and key ways.	
43.14 Set up and demonstrate tapping operations.	

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Grade Level: 10-12 Skills/Subject Area: Machine Shop

COMPETENCY GOAL 44: The learner will identify the basic parts of bench and pedestal grinders. Demonstrate skills in setting up for, and performing grinding operations.

Objectives	Measures
44.1 Identify safety hazards in using bench and pedestal grinders and explain safe operating practices.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
44.2 Identify a safely set up bench or pedestal grinder.	
44.3 Select and mount grinding wheels.	
44.4 Dress and/or true grinding wheels mounted on a pedestal or bench grinder.	
44.5 Set workrest and spark arrestor properly.	
44.6 Deburr parts with the bench or pedestal grinder.	
44.7 Sharpen chisels, punches, and screwdrivers.	
44.8 Sharpen twist drills, using freehand method.	
44.9 Sharpen tool bits, using freehand method.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Machine Shop

COMPETENCY GOAL 45: The learner will identify and describe the major precision grinding processes, precision grinding machines, and their industrial applications.

Objectives	Measures
45.1 Identify the major precision grinding processes.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
45.2 Describe the safe and proper procedures for grinding.	

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Grade Level: 10-12　　　　Skills/Subject Area: Machine Shop

COMPETENCY GOAL 46: The learner will describe the components and accessories of the precision surface grinder, and explain their functions.

Objectives	Measures
46.1 Identify safety hazards in using the precision surface grinder, and explain safe operating practices.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
46.2 Describe the functions or applications of a precision surface grinder.	
46.3 Identify the major parts of the surface grinder and describe their functions.	

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Grade Level: 10-12 Skills/Subject Area: Machine Shop

COMPETENCY GOAL 47: The learner will demonstrate skills in set up and safe performance operations on the precision surface grinder.

Objectives		Measures
47.1	Inspect the wheel for imperfections.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
47.2	Select and mount a wheel on the surface grinder.	
47.3	Set up and/or adjust all safety equipment.	
47.4	Balance, true, and dress the grinding wheel on the surface grinder.	
47.5	Set up, grind in a magnetic chuck for use.	
47.6	Grind flat surfaces to specifications.	
47.7	Grind vertical surfaces to specifications.	
47.8	Grind angular surfaces to specifications.	
47.9	Grind slotted parts to specifications.	
47.10	Grind hardened parts to specifications.	
47.11	Grind radii to specifications.	
47.12	Grind bevels to specifications.	
47.13	Grind steps to specifications.	

Grade Level: 10-12 Skills/Subject Area: Machine Shop

COMPETENCY GOAL 48: The learner will identify and describe the components and functions of a centerless grinder.

Objectives	Measures
48.1 Describe the major application of the centerless grinder.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
48.2 Identify the main parts of the centerless grinder and describe their function.	

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Grade Level: 10-12 Skills/Subject Area: Machine Shop

COMPETENCY GOAL 49: The learner will demonstrate skills in the safe set up and performance of operations on the centerless grinder.

Objectives	Measures
49.1 Identify safety hazards in using the centerless grinder, and explain safe operating practices.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
49.2 Select correct wheel and install, balance, dress, and true the wheel.	
49.3 Adjust all safety devices for maximum effectiveness.	
49.4 Through grind parts to specifications.	
49.5 In-feed grind parts to specifications.	
49.6 End feed grind parts to specifications.	
49.7 Crush form grind parts to specifications.	
49.8 Operate grinder in wet and dry grinding operations.	

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Grade Level: 10-12 Skills/Subject Area: Machine Shop

COMPETENCY GOAL 50: The learner will identify and describe the components of a center type cylindrical grinder.

Objectives	Measures
50.1 Describe the major applications of the center type cylindrical grinder.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
50.2 Identify the main parts of the center type cylindrical grinder and describe their functions.	

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Grade Level: 10-12 Skills/Subject Area: Machine Shop

COMPETENCY GOAL 51: The learner will demonstrate skills in the safe set up and performance of operations on the center type cylindrical grinder.

Objectives	Measures
51.1 Identify safety hazards in using the center type cylindrical grinder.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
51.2 Select correct wheel and install, balance, dress, and true the wheel.	
51.3 Adjust all safety devices for maximum effectiveness.	
51.4 Straight grind to specifications.	
51.5 Grind internal and external tapers.	
51.6 Grind bores to specifications.	
51.7 Form grind to specifications.	
51.8 Grind shoulders to specifications.	
51.9 Select the proper grinding mode, wet or dry, and demonstrate its use.	

Grade Level: 10-12 Skills/Subject Area: Machine Shop

COMPETENCY GOAL 52: The learner will identify and describe the components and functions of a tool and cutter grinder.

Objectives	Measures
52.1 Describe the major applications of the tool and cutter grinder.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
52.2 Identify the main parts of the tool and cutter grinder and describe their functions.	
52.3 Identify tool and cutter grinder accessories and describe their functions.	

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Grade Level: 10-12 Skills/Subject Area: Machine Shop

COMPETENCY GOAL 53: The learner will demonstrate skills in the safe set up and use of the tool and cutter grinder.

Objectives	Measures
53.1 Identify safety hazards in using the tool and cutter grinder, and explain safe operating practices.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
53.2 Select correct wheel and install, balance, dress, and true the wheel.	
53.3 Adjust all safety devices for maximum effectiveness.	
53.4 Demonstrate skills in setting up and grinding between centers on the tool and cutter grinder.	

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Grade Level: 10-12 Skills/Subject Area: Machine Shop

COMPETENCY GOAL 54: The learner will demonstrate skills in setting up equipment for lapping, and in performing lapping operations.

Objectives	Measures
54.1 Identify safety hazards in lapping, and explain safe operating practices.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851,7852, 7853.
54.2 Select the proper lapping compound and tool for a specified job.	
54.3 Charge a plate correctly.	
54.4 Lap a cylindrical plug to specifications.	
54.5 Lap a hole to specifications.	
54.6 Lap a flat surface to specifications.	

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Grade Level: 10-12 Skills/Subject Area: Machine Shop

COMPETENCY GOAL 55: The learner will demonstrate skills in honing operations.

Objectives	Measures
55.1 Identify safety hazards in honing and explain safe operating practices.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
55.2 Select proper hone stones, hone speeds, and settings for a specified job.	
55.3 Hone a true and straight hole.	

Grade Level: 10-12 Skills/Subject Area: Machine Shop

COMPETENCY GOAL 56: The learner will describe the function of and use of a profiler or pantograph.

Objectives	Measures
56.1 **Describe the applications of a pantograph of profiler.**	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.

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Grade Level: 10-12 Skills/Subject Area: Machine Shop

COMPETENCY GOAL 57: The learner will identify common types of numerical control systems.

Objectives		Measures
57.1	Identify and describe the common numerical control systems being used in United States industry.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.

Grade Level: 10-12 Skills/Subject Area: Machine Shop

COMPETENCY GOAL 58: The learner will demonstrate skills in setting up and using a numerical control system.

Objectives	Measures
58.1 Develop a numerical control program to produce a specified part.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
58.2 Set up and operate a numerical control machine to produce a specified part.	

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Grade Level: 10-12 Skills/Subject Area: Machine Shop

COMPETENCY GOAL 59: The learner will describe the functions of, and demonstrate skills in, the set up and use of the electrical discharge machine.

Objectives	Measures
59.1 Describe the principles of electrical discharge machine operations.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
59.2 Identify safety hazards in using the electrical discharge machine and explain safe operating practices.	
59.3 Describe the applications of the electrical discharge machine.	
59.4 Set up and operate the electrical discharge machine safely to produce a part to specifications.	

Grade Level: 10-12 Skills/Subject Area: Machine Shop

COMPETENCY GOAL 60: The learner will describe the function(s) of the jig bore.

Objectives	Measures
60.1 Describe the function(s) of the jig bore.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
60.2 List the safe and proper procedures for using the jig bore.	

Grade Level: 10-12 Skills/Subject Area: Machine Shop

COMPETENCY GOAL 61: The learner will describe the basic heat treatment processes, describe their purpose and applications, and demonstrate skills in performing these processes.

Objectives	Measures
61.1 Select appropriate heat treatment processes for a specified product.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
61.2 Discuss the processes (e.g., hardening, tempering, annealing, normalizing, case hardening, flame hardening, and age hardening) and describe the results of heat treatment.	
61.3 Demonstrate skills in hardening, tempering, annealing, normalizing, case hardening, flame hardening, and age hardening.	

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Grade Level: 10-12 Skills/Subject Area: Machine Shop

COMPETENCY GOAL 62: The learner will describe the purpose of hardness testing, tensile testing, compression and shear testing, and demonstrate skills in testing procedures.

Objectives	Measures
62.1 Describe the purpose of hardness testing, tensile testing, compression testing, and shear testing.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
62.2 Demonstrate hardness testing, tensile testing, compression testing, and shear testing.	
62.3 Make decisions based on the data from hardness tests, compression tests, tensile tests, and shear tests.	

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Grade Level: 10-12 Skills/Subject Area: Machine Shop

COMPETENCY GOAL 63: The learner will identify and describe oxyacetylene welding, cutting and joining processes, and the required equipment.

Objectives	Measures
63.1 Describe the basic oxyacetylene processes and machine shop applications.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
63.2 Identify each part of the oxyacetylene welding unit and describe their function.	
63.3 Identify and demonstrate safety practices in using the oxyacetylene welding unit, and explain safe operating practices.	
63.4 Set up an oxyacetylene station correctly.	
63.5 Test an oxyacetylene station for leaks using a soap solution.	
63.6 Demonstrate skills in the set up and operation of the oxyacetylene unit in performing soldering, brazing, welding, and cutting operations.	

Grade Level: 10-12 Skills/Subject Area: Machine Shop

COMPETENCY GOAL 64: The learner will identify and describe arc-welding joining processes and required equipment.

Objectives	Measures
64.1 Describe the basic arc-welding processes, and machine shop applications.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
64.2 Identify common arc-welding systems, the components making up the system, and the function of each system (AC welding, DC welding, resistance welding, inert gas welding).	
64.3 Identify safety hazards in using arc/gas welding equipment, and explain safe operating practices.	
64.4 Select a welding system appropriate to a job.	
64.5 Demonstrate skills in the correct use of AC welders, DC welders, resistance welders, and inert gas welders.	
64.6 Select electrodes which are appropriate to the job.	

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Grade Level: 10-12 Skills/Subject Area: Machine Shop

COMPETENCY GOAL 65: The learner will demonstrate listening skills.

Objectives	Measures
65.1 Demonstrate ability to acquire information and context through listening to both human and mechanical sources.	Refer to competency Test Item Bank VEC-T&I-C/TB 7851, 7852, 7853.
65.2 Follow oral instructions for job tasks.	

Marine Occupations Outline

1. Safety

    a. Safety equipment
    b. First aid
    c. Safety aboard a vessel
    d. Weather

2. Boating Skills

    a. Types and designs
    b. Anchoring techniques
    c. State/Federal regulations
    d. Navigation
    e. Marline spike skills

3. Harvesting Equipment

    a. Net and trap
    b. Net repairs

4. Fishing Methods

    a. Types of fish
    b. Recognition of species development

5. Engines (marine)

    a. Gasoline
    b. Diesel
    c. Terms

6. Oceanography

    a. Topography
    b. Currents
    c. Waves
    d. Tides
    e. Beaches
    f. Salinity
    g. Equipment
    h. Marine life groups

7. Leadership Development

    a. Characteristics of a good leader
    b. Parliamentary procedure
    c. VICA participation

Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 1: The learner will identify various types of safety equipment.

Objectives		Measures
1.1	Describe and demonstrate personal floatation device I, II, III, IV, V.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
1.2	Identify and describe the classes of fires and fire extinguishers.	
1.3	Identify various types of devices used for distress signaling.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 2: The learner will recognize, demonstrate, and perform various types of first aid activities aboard a vessel.

Objectives	Measures
2.1 Identify and demonstrate methods to stop bleeding.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
2.2 Identify first aid materials.	
2.3 Identify fractures and sprains and demonstrate proper treatment.	
2.4 Demonstrate knowledge and skill in cardiac-pulmonary resuscitation.	
2.5 Demonstrate methods used to treat a drowning person.	
2.6 Identify types of burns and treatments.	
2.7 Identify seasick symptoms and care.	
2.8 Identify various types of dangerous fish and other organisms.	
2.9 Explain the methods of removing an embedded fish hook.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 3: The learner will identify and explain the rules for personal and general safety aboard a vessel.

Objectives		Measures
3.1	Recognize the problem that will occur if a vessel is overloaded.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
3.2	Identify methods used to maintain a clean and orderly vessel.	
3.3	Identify rules for personal safety aboard a vessel.	

Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 4: The learner will explain and describe weather conditions for safe boating.

Objectives		Measures
4.1	Describe the different types of clouds.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
4.2	Interpret weather conditions from daily forecast (weather map, VHF radio, barometer).	
4.3	Identify different types of storms.	
4.4	Recognize various types of winds.	
4.5	Describe high and low pressures.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 5: The learner will recognize how different types and designs of boats react under all kinds of circumstances.

Objectives		Measures
5.1	Explain why boats of all types and designs react differently under like situations.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
5.2	Explain the use of wind and current in maneuvering boats (docking).	
5.3	Explain the effect that the propeller and rudder have on the boat.	
5.4	Explain the use of fenders.	
5.5	Explain the difference between a single and a twin screw.	
5.6	Describe the use of proper lines when docking (e.g., spring, bow, and stern).	
5.7	Recognize the effect that different sea conditions have on a boat (e.g., size and angle).	
5.8	Analyze running an inlet.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 6: The learner will demonstrate anchoring and anchoring techniques.

Objectives	Measures
6.1 Identify the types and sizes of anchors.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
6.2 Identify the different parts of anchors.	
6.3 Explain Rode and Scope.	
6.4 Demonstrate proper assemblage of ground tackle.	
6.5 Demonstrate proper method in anchoring.	
6.6 Demonstrate securing an anchor aboard a boat.	

Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 7: The learner will identify and describe the parts of a boat.

	Objectives	Measures
7.1	Identify and describe directional terms and parts of a vessel.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
7.2	Identify structural hull parts aboard a vessel.	
7.3	Identify other nautical terms used aboard a vessel.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 8: The learner will identify motorboat regulations.

Objectives	Measures
8.1 Identify motorboat regulations as set forth in the Motorboat Act of 1940.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
8.2 Identify motorboat regulations as set forth in the Motorboat Act of 1958.	
8.3 Identify motorboat regulations as set forth in the Motorboat Act of 1971.	
8.4 Explain the difference between documentation and motorboat registration.	
8.5 Recognize the various types of documentation.	
8.6 Explain the licensing procedures concerned with renting or leasing a motorboat or carrying paying passengers.	
8.7 Recognize the laws and penalties in regard to pollution.	

Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 9: The learner will identify and describe the duties of the Captain.

Objectives	Measures
9.1 Describe the primary duties and responsibilities of the Captain (e.g., maintaining ship's log).	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
9.2 Explain the qualities desirable in a captain.	

Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 10: The learner will define nautical charts.

	Objectives	Measures
10.1	Identify longitude and latitude.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
10.2	Interpret the nautical chart legends.	

Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 11: The learner will explain aids to navigation (off boat).

	Objectives	Measures
11.1	Identify various types of aids to navigation.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
11.2	Discuss the various types of aids to navigation.	

Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 12: The learner will explain navigational aids (on boat).

	Objectives	Measures
12.1	Identify various types of navigational aids.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
12.2	Discuss the various types of navigational aids.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 13: The learner will describe plotting.

Objectives		Measures
13.1	Identify instruments used in plotting.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
13.2	Define "dead reckoning."	
13.3	Demonstrate plotting techniques.	
13.4	Define "set and drift."	

Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 14: The learner will define "rules of the road."

Objectives		Measures
14.1	Identify the four sets of "rules of the road."	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
14.2	Describe lights and day shapes.	
14.3	Describe sound signals.	
14.4	Define three types of encounters.	

Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 15: The learner will identify natural and synthetic line, steel, and combination cable.

	Objectives	Measures
15.1	Identify and tie ten basic knots.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
15.2	Demonstrate the ability to perform the four basic splices.	
15.3	Explain proper maintenance of lines.	
15.4	Describe proper knots and splices and explain the function of each.	
15.5	Demonstrate three methods of whipping a line.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 16: The learner will define blocks and tackles.

	Objectives	Measures
16.1	Identify and name ten basic parts of a block.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
16.2	Define proper maintenance repair and preservation of blocks and tackle.	
16.3	Experience working with four kinds of tackle.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 17: The learner will describe canvas and allied skills.

	Objectives	Measures
17.1	Describe tools and use of tools in sailmaking.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
17.2	Describe allied uses of sailmaking skills in other areas such as boat top, convertible, rug, and upholstery repair.	
17.3	Develop skills in using sailmaking tools.	
17.4	Present, to qualified examiner, some project such as ditty bag, boat cover, or utility items made from canvas, heavy duty denim, or stock material.	
17.5	Demonstrate each of the four basic stitches used in canvas manufacture or repair.	

Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 18: The learner will recognize various vessel types and designs.

Objectives	Measures
18.1 Identify the various types of vessels.	Refer to Competency Test Item Bank VEC-T&I-C/TB
18.2 Describe various motorboat designs.	7751, 7752, 7753.

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 19: The learner will recognize materials used for constructing motorboats.

Objectives	Measures
19.1 Evaluate the different types of wood.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
19.2 Evaluate different metals used in boat building.	
19.3 Recognize fiberglass.	
19.4 Describe ferro cement.	
19.5 Evaluate the durability of materials used in hull fastenings (e.g., nails, screws, various cloth, grades of steel).	

Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 20: The learner will explain boat maintenance on vessels constructed from various materials and boat designs.

Objectives		Measures
20.1	Demonstrate the proper procedures in cleaning boats constructed from various materials.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
20.2	Recognize problems that may exist before and after cleaning boats constructed from various materials.	
20.3	Select the proper paints and other materials used in boat maintenance.	
20.4	Demonstrate the proper procedures used in applying paints and other maintenance materials.	
20.5	Recognize the importance of completing the job (e.g., clean-up).	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 21: The learner will develop net and trap communication skills.

Objectives	Measures
21.1 Develop a glossary of netmaking terms.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
21.2 Develop a glossary of trapmaking terms.	
21.3 Develop a glossary of net repair terms.	
21.4 Identify netmaking terms.	
21.5 Identify trapmaking terms.	
21.6 Identify net repair terms.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 22: The learner will develop methods for net repairs.

Objectives	Measures
22.1 Recognize the necessary equipment for net repair.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
22.2 Identify the proper materials for net repair.	
22.3 Describe the rules for net repair.	
22.4 Demonstrate the basic knots in net repair.	
22.5 Demonstrate net repair skills.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 23: The learner will describe trawl nets.

Objectives	Measures
23.1 Identify the types of trawls.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
23.2 Recognize materials used in the construction of trawl nets.	
23.3 Construct a trawl net.	

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Grade Level: 10-12　　Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 24: The learner will recognize gill nets.

Objectives	Measures
24.1 Identify the types of gill nets.	Refer to Competency Test Item Bank VEC-T&I-C/TB
24.2 Recognize materials in gill nets.	7751, 7752, 7753.
24.3 Describe construction of hanging nets.	
24.4 Construct a gill net.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 25: The learner will recognize pound nets.

Objectives	Measures
25.1 Identify types of pound nets.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
25.2 Demonstrate construction of pound nets.	
25.3 Recognize materials in pound nets.	
25.4 Construct a pound net.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 26: The learner will identify a haul seine.

Objectives	Measures
26.1 Identify types of haul seines.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
26.2 Recognize materials in haul seines.	
26.3 Demonstrate the construction of haul seines.	
26.4 Construct a haul seine.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 27: The learner will identify cast nets.

Objectives		Measures
27.1	Recognize the materials in a cast net.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
27.2	Demonstrate the construction of a cast net.	
27.3	Construct a cast net.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 28: The learner will identify purse seines.

Objectives		Measures
28.1	Recognize materials in a purse seine.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
28.2	Demonstrate the construction of a purse seine.	
28.3	Construct a purse seine.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 29: The learner will identify various types of traps.

Objectives	Measures
29.1 Recognize materials used in traps.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
29.2 Demonstrate the construction of traps.	
29.3 Construct a trap.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 30: The learner will identify the species of fin fish.

Objectives	Measures
30.1 Recognize the species of fin fish by name.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
30.2 Describe habitat for each species.	
30.3 Predict seasons for harvesting each species.	
30.4 Explain government regulations for each species.	
30.5 Evaluate harvesting methods for each species.	
30.6 Demonstrate fish catching methods.	
30.7 Explain methods for "on board" preservation of fin fish.	

Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 31: The learner will identify the species of crustaceans.

Objectives	Measures
31.1 Recognize the species of crustaceans by name.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
31.2 Describe habitat for each species.	
31.3 Predict seasons for harvesting each species.	
31.4 Explain government regulations for each species.	
31.5 Evaluate harvesting methods for each species.	
31.6 Demonstrate harvesting methods by species.	
31.7 Explain methods for "on board" preservation of crustaceans.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 32: The learner will identify the species of shellfish.

Objectives		Measures
32.1	Recognize the species of shellfish by name.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
32.2	Describe habitat for each species.	
32.3	Predict seasons for harvesting shellfish.	
32.4	Explain government regulations for shellfish.	
32.5	Evaluate harvesting methods for shellfish.	
32.6	Demonstrate harvesting methods for shellfish.	
32.7	Explain methods for "on board" preservation of shellfish.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 33: The learner will identify underdeveloped species.

Objectives	Measures
33.1 Recognize underdeveloped species by name.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
33.2 Describe the habitat for each species.	
33.3 Predict seasons for harvesting each species.	
33.4 Explain government regulations for each species.	
33.5 Evaluate harvesting methods for each species.	
33.6 Assess future market potential.	
33.7 Explain methods for "on board" preservation of underdeveloped species.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 34: The learner will demonstrate proper use of marine radios.

Objectives	Measures
34.1 Identify types of marine radios.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
34.2 Explain the characteristics of each type.	
34.3 Discuss the FCC regulations for marine radio use.	
34.4 Recognize the required licenses for marine radio operation.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 35: The learner will recognize signaling.

Objectives	Measures
35.1 Describe the flags and lights.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
35.2 Recognize the alphabet by flags and lights.	
35.3 Translate communications from flags and lights.	
35.4 Demonstrate communication through flags and lights.	
35.5 Define the International Code of Signals (Publication #102).	
35.6 Define flag etiquette.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 36: The learner will identify different types of inboard engines.

	Objectives	Measures
36.1	Describe the differences between gasoline and diesel power units.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
36.2	Explain the difference between two-cycle and four-cycle gasoline engines.	
36.3	Explain different types of diesel units.	
36.4	Describe problems with fuel injection systems.	
36.5	Describe problems with ignition systems.	
36.6	Demonstrate an ability to repair and troubleshoot problems in exhaust systems.	
36.7	Demonstrate the ability to repair and analyze cooling system problems.	
36.8	Describe the problems involved in winterizing a motor to prevent weather damage.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 37: The learner will recognize outboard motor systems.

Objectives		Measures
37.1	Recognize different makes and models of outboard engines.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
37.2	Identify troubleshooting techniques.	
37.3	Identify cooling systems of outboards.	
37.4	Identify and repair various kinds of ignition systems, including the newest types of electronic systems.	
37.5	Disassemble and reassemble an outboard motor.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 38: The learner will describe bottom topography.

Objectives	Measures
38.1 Identify major bottom features.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
38.2 Compare and contrast canyons and trenches.	
38.3 Draw and label the continental shelf.	
38.4 Locate local (i.e., east coast) bottom features.	
38.5 Discuss why continental shelf areas are productive fishing grounds.	
38.6 Explain how and why artificial reefs are constructed.	
38.7 List and explain three methods used to map the ocean floor.	
38.8 Explain the origin of major bottom features.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 39: The learner will explain ocean currents.

Objectives	Measures
39.1 Explain the origin of ocean currents.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
39.2 Discuss oceanographic equipment used to measure current velocity and direction.	
39.3 Locate major surface ocean currents.	
39.4 Explain the cause of upwelling.	
39.5 Discuss the effect of upwelling on fisheries.	
39.6 Locate areas of major upwelling.	
39.7 Show the relationship between global weather patterns and major ocean currents.	
39.8 Describe cause and effect of local current such as a rip current.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 40: The learner will describe waves.

Objectives	Measures
40.1 Explain the two basic causes of waves.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
40.2 Discuss the physics of water molecules within a wave.	
40.3 List and discuss factors that affect wave size.	
40.4 Explain the origin of the longshore current.	
40.5 Identify various wave types.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 41: The learner will identify the types of tides.

Objectives	Measures
41.1 Explain the causes of tides.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
41.2 Discuss the effect of tides on various marine habitats.	
41.3 Explain how the slope and size of basins affect tides.	
41.4 List types of commercial marine species caught best during high tide and low tide.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 42: The learner will recognize beach building and erosion processes.

Objectives	Measures
42.1 Distinguish between summer and winter beaches.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
42.2 Discuss inlet migration.	
42.3 Relate rising sea level to beach erosion.	
42.4 Describe various means of beach stabilization.	
42.5 Discuss strengths and weaknesses of each stabilization method.	
42.6 Explain overwash.	
42.7 Describe the fragile relationships that maintain the barrier islands.	
42.8 Explain the history of local barrier islands.	
42.9 Explain CAMA.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 43: The learner will measure the salinity of seawater.

Objectives	Measures
43.1 Measure salinity of a seawater sample.	Refer to Competency Test Item Bank VEC-T&I-C/TB
43.2 Discuss causes for salinity variation.	7751, 7752, 7753.
43.3 Draw and explain a halocline.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 44: The learner will know the factors affecting the temperature of seawater.

Objectives	Measures
44.1 List five factors that influence the seawater temperature.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
44.2 Draw and explain a thermocline.	
44.3 Discuss the effect of surface water temperature and weather.	
44.4 Explain the formation and importance of sea ice.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 45: The learner will describe the variables that affect seawater density.

Objectives	Measures
45.1 Explain the formation and movement of water masses.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
45.2 Discuss how a water mass can be tracked.	
45.3 Discuss the importance of water as a solvent.	

Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 46: The learner will discuss factors that influence light attenuation in seawater.

Objectives	Measures
46.1 Explain the relationships between light and fishing productivity.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
46.2 Explain the use of light meters.	
46.3 Demonstrate the use of the secchi disc.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 47: The learner will recognize oceanographic equipment.

Objectives	Measures
47.1 Identify applied research.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
47.2 Identify pure research.	
47.3 Identify one local research vessel.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 48: The learner will describe the use of instruments and equipment.

Objectives	Measures
48.1 Explain the operation of a grab sampler/ dredge.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
48.2 Explain the operation of a piston cover.	
48.3 Explain the operation of a plankton net.	
48.4 Explain the operation of a trawl.	
48.5 Explain the operation of a nissen bottle/Van Doren/Nansen.	
48.6 Explain the reversing thermometer, B/T.	
48.7 Explain sonar.	
48.8 Describe the use of cameras.	
48.9 Explain PH meter/dissolved O2.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 49: The learner will identify bacteria/protozoans.

Objectives	Measures
49.1 Explain the basic morphology of bacteria.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
49.2 Discuss the trophic position of bacteria.	
49.3 Relate the presence of bacteria to closed shellfish waters.	
49.4 Describe the operation of basic sewage disposal systems.	
49.5 Demonstrate relationships between population density and bacterial pollution.	
49.6 Demonstrate an awareness of the decision-making process concerning industrial and recreational development.	
49.7 Discuss the effect of parasitic and symbiotic relationships.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 50: The learner will identify major plankton groups.

Objectives	Measures
50.1 Explain the importance of nutrients to plankton productivity.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
50.2 Explain the nitrogen, phosphorous, and carbon cycles.	
50.3 Relate upwelling to plankton productivity.	
50.4 Discuss three factors that influence plankton productivity.	
50.5 Determine the photosynthetic rate of marine plankton using dark and light bottle method.	
50.6 Demonstrate use of plankton nets.	
50.7 Explain plankton patchiness.	
50.8 Construct a food chain of plankton organisms.	

Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 51: The learner will list and state the major characteristics of each marine animal.

Objectives	Measures
51.1 Discuss the economic importance of each marine phylum.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
51.2 Discuss adaptations of marine animals to the various physical and chemical conditions of marine habitats.	
51.3 Recognize and explain relationships that exist between living organisms.	
51.4 Describe the life cycles of commercially important species.	
51.5 Discuss the effect of industrial, chemical, and biological pollution on the major marine species.	

Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 52: The learner will list and state the major characteristics of each marine plant.

Objectives	Measures
52.1 Discuss the economic importance of each marine phylum.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
52.2 Discuss adaptations of marine plants to the various physical and chemical conditions of marine habitats.	
52.3 Recognize and explain relationships that exist between marine species.	
52.4 Describe the life cycle of commercially important species.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 53: The learner will describe major marine habitats.

Objectives	Measures
53.1 Draw and label a transect of a "typical" barrier island (animal/plant).	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
53.2 Predict plant succession that follows overwash.	
53.3 Draw and label a transect of a salt marsh (plants/animals).	
53.4 Explain the effect of a salt wedge on the organisms inhabiting a river.	
53.5 Explain the relationship between substrate type and organisms present.	
53.6 Discuss the importance of estuarine areas on commercial fishing.	

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Grade Level: 10-12

Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 54: The learner will identify the types of boat expenses.

Objectives	Measures
54.1 Analyze boat financing.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
54.2 Predict equipment cost, repair, and maintenance.	
54.3 Evaluate the feasibility of converting boat equipment for different types of fishing.	
54.4 Explain trip expenses.	
54.5 Describe all necessary types of boat insurance.	

Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 55: The learner will describe marketing of the catch.

Objectives	Measures
55.1 Recognize the most suitable market.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
55.2 Evaluate wholesale versus retail marketing.	
55.3 Describe preparation for retail marketing.	
55.4 Describe co-op marketing.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 56: The learner will recognize the methods of crew sharing.

Objectives	Measures
56.1 Explain the systems for crew sharing.	Refer to Competency Test Item Bank VEC-T&I-C/TB
56.2 Describe crew deductions.	7751, 7752, 7753.

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 57: The learner will explain boat bookkeeping.

Objectives	Measures
57.1 Prepare a ledger for a hypothetical boat.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
57.2 Discuss the importance of a ledger.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 58: The learner will estimate capital outlay requirements for a specific mariculture operation.

Objectives	Measures
58.1 Determine energy requirements for various mariculture operations.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
58.2 Locate markets for their crops.	
58.3 Demonstrate an awareness of transportation costs.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 59: The learner will describe a piece of land suitable for a mariculture operation.

Objectives	Measures
59.1 Discuss local zoning restrictions that would/could affect such an operation.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
59.2 Explain antipollution laws affecting a mariculture operation.	
59.3 Describe the process of leasing tidal and subtidal bottom.	
59.4 Discuss loan procedures.	
59.5 Understand the depuration process.	

Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 60: The learner will explain basic research done on major mariculture organisms.

Objectives	Measures
60.1 List major aquaculture/mariculture journals and magazines.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
60.2 Discuss the importance of remaining technically updated.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 61: The learner will describe an open mariculture system.

Objectives	Measures
61.1 List three species that grow well.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
61.2 Describe a piece of land that could support a specific open mariculture.	
61.3 List and discuss the pros and cons of an open mariculture system.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 62: The learner will describe a closed mariculture system.

Objectives	Measures
62.1 List three species that grow well.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
62.2 Describe a piece of land that could support a specific closed mariculture operation.	
62.3 List and discuss the pros and cons of a closed mariculture system.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 63: The learner will understand mariculture organisms.

Objectives		Measures
63.1	Select organisms that would grow well in specific geological locations.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
63.2	Select organisms that would grow well in specific mariculture operations.	
63.3	Recognize that simple life cycles usually produce best results.	
63.4	Select proper food for the various life cycle stages.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 64: The learner will describe a hatcher operation.

Objectives	Measures
64.1 Describe the hatcher stage of a marine species.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
64.2 Discuss the special needs of larval stages of a marine species.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 65: The learner will describe the major types of grow-out operations.

Objectives	Measures
65.1 Explain ponds.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
65.2 Explain raceways.	
65.3 Explain pens.	
65.4 Explain tanks.	
65.5 Explain leased bottom.	
65.6 Select the most suitable grow-out procedure for a specific geographical area.	
65.7 Select the most suitable grow-out procedure for a specific organism.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 66: The learner will identify characteristics of a good leader.

Objectives	Measures
66.1 Define "leadership."	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
66.2 Name characteristics of a good leader.	
66.3 Identify selected leaders within the community and list three factors that identify each as a leader.	

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Grade Level: 10-12　　　Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 67: The learner will demonstrate an understanding of parliamentary procedure.

Objectives	Measures
67.1 Describe the importance and use of parliamentary procedure	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
67.2 List the items of a business agenda.	

Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 68: The learner will perform correctly seventeen steps of parliamentary procedure.

Objectives	Measures
68.1 Demonstrate the following parliamentary procedure abilities: main motion, amend, previous question, point of order, nominations and elections, and adjourn.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
68.2 Demonstrate the following parliamentary procedure abilities: appeal from decision of the chair, lay on the table, take from the table, refer to committee, and parliamentary inquiry.	
68.3 Demonstrate the following parliamentary procedure abilities: suspend standing rules, division of assembly, leave to withdraw a motion, reconsider, rescind, and call for orders of the day.	

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Grade Level: 10-12 Skills/Subject Area: Marine Occupations

COMPETENCY GOAL 69: The learner will participate in a youth club meeting (VICA).

Objectives	Measures
69.1 Preside over a VICA business meeting.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7751, 7752, 7753.
69.2 Preside over a VICA committee meeting.	

Masonry Outline

1. Orientation
    a. Identification of brick
    b. Manufacturing process

2. Tools and Equipment
    a. Hand tools
    b. Power tools
    c. Related equipment

3. Safety
    a. Personal and job safety
    b. Rules and descriptions of clothes to be worn

4. Materials
    a. Mortars
    b. Masonry units

5. Human Relations and Leadership
    a. Job advancement
    b. Free enterprise system
    c. Becoming a good leader

6. Related Information
    a. Basic trade arithmetic
    b. Basic blueprint reading
    c. Measuring
    d. Builder's level

7. Shop
    a. Spreading mortar and laying brick to a line
    b. Wall layout and construction
    c. Chimneys and fireplaces
    d. Cut stone
    e. Related layout and construction
    f. Basic gas cutting
    g. Basic arc welding

8. Cleaning, Painting, and Caulking
    a. Procedure
    b. Identification

9. Leadership

   a. Characteristics of a good leader
   b. Importance of parliamentary procedure
   c. Correct use of 17 parliamentary procedures
   d. VICA participation

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Masonry

COMPETENCY GOAL 1: The learner will identify the quality of different bricks, and the occupational outlook of the bricklaying trade.

Objectives		Measures
1.1	Match terms associated with orientation with the correct definitions.	Refer to competency Test Item Bank VEC-T&I-C/TB 7471, 7472, 7473.
1.2	Identify employment opportunities for the bricklayer.	
1.3	Recognize factors concerning the occupational outlook for the bricklaying trade.	
1.4	Identify the student requirements for the bricklaying program.	
1.5	Identify the major skills needed by the bricklayer.	
1.6	Complete a personal information sheet.	
1.7	Describe the history of brick.	
1.8	Identify the kinds of brick and their uses.	
1.9	Describe the brick manufacturing process.	

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Grade Level: 10-12 Skills/Subject Area: Masonry

COMPETENCY GOAL 2: The learner will identify basic hand tools, methods of proper selection, and safety measures to be practiced when using them.

Objectives		Measures
2.1	Identify types of jointers, hammers, squares, and spacing rules.	Refer to competency Test Item Bank VEC-T&I-C/TB 7471, 7472, 7473.
2.2	Identify tools used in determining course alignment.	
2.3	Identify miscellaneous tools of the bricklaying trade.	
2.4	Identify the parts of a brick trowel.	
2.5	Identify factors to consider in selecting a brick trowel.	
2.6	Identify the basic rules concerning the care and safe use of hand tools.	

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Grade Level: 10-12 Skills/Subject Area: Masonry

COMPETENCY GOAL 3: The learner will identify and use power tools and types of of scaffolds, and name safety factors to consider when operating a masonry table saw.

Objectives	Measures
3.1 Recognize terms associated with power tools.	Refer to competency Test Item Bank VEC-T&I-C/TB 7471, 7472, 7473.
3.2 Identify power tools used by the bricklayer.	
3.3 Identify the parts of the masonry table saw.	
3.4 Identify types of cutting blades used on a masonry table saw.	
3.5 Identify types of scaffolds.	
3.6 Recognize power tools for specific job uses.	
3.7 Identify factors to consider in caring for the masonry table saw.	
3.8 Identify safety rules to follow when operating the masonry table saw.	
3.9 Demonstrate the use of a masonry table saw with an abrasive and diamond blade.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Masonry

COMPETENCY GOAL 4: The learner will identify equipment that the bricklayer will find on some jobs and the hand signals used in moving heavy equipment and materials.

	Objectives	Measures
4.1	Recognize terms associated with euipment.	Refer to competency Test Item Bank VEC-T&I-C/TB 7471, 7472, 7473.
4.2	Identify equipment that the bricklayer will find on some jobs.	
4.3	Relate equipment to the specific job use.	
4.4	Identify hand signals used in moving heavy equipment and materials.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Masonry

COMPETENCY GOAL 5: The learner will identify and explain the rules for personal and general safety, and describe types of clothing to wear on the job.

Objectives	Measures
5.1 Match terms asociated with personal and job safety with the correct definitions.	Refer to competency Test Item Bank VEC-T&I-C/TB 7471, 7472, 7473.
5.2 Describe types of clothing a person should wear on the job.	
5.3 Identify rules for personal safety.	
5.4 Identify rules for general job safety.	
5.5 Identify methods used to maintain a clean and orderly work area.	
5.6 Identify the correct way to lift heavy objects.	
5.7 Follow rules or instructions in completing a safety checklist.	
5.8 Follow rules or instructions in completing a safety pledge form.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Masonry

COMPETENCY GOAL 6: The learner will know the ingredients, ratios, and proper operations for mixing mortar.

Objectives	Measures
6.1 Match terms associated with mortars to the correct definitions.	Refer to competency Test Item Bank VEC-T&I-C/TB 7471, 7472, 7473.
6.2 Identify the ingredients of mortar.	
6.3 Match types of mortar to specific use.	
6.4 Identify factors to consider when mixing mortar.	
6.5 Recognize factors that affect mortar.	
6.6 Recognize common ratios of mortar mixes.	
6.7 Identify the effects of salt on mortar.	
6.8 Identify the steps used when mixing mortar with a mechanical mixer and by hand.	
6.9 Explain care of the mechanical mixer.	
6.10 Demonstrate the correct method of mixing mortar by hand and with a mechanical mixer.	

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Grade Level: 10-12 Skills/Subject Area: Masonry

COMPETENCY GOAL 7: The learner will identify various masonry units, including their parts and uses.

Objectives	Measures
7.1 Recognize terms associated with masonry units.	Refer to competency Test Item Bank VEC-T&I-C/TB 7471, 7472, 7473.
7.2 Identify the parts of a brick.	
7.3 Identify kinds of brick according to dimensions, modular, and non-modular.	
7.4 Identify brick according to position in the wall.	
7.5 Identify types of structural clay tile units.	
7.6 Identify parts, types, and shapes of concrete masonry units.	
7.7 Identify kinds of sills and lintels.	
7.8 Identify the types and the principal uses of cut stone.	
7.9 Identify principal uses of prefabricated units.	
7.10 Identify accessories used with masonry units.	

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Grade Level: 10-12 Skills/Subject Area: Masonry

COMPETENCY GOAL 8: The learner will identify characteristics employers consider in deciding whom to promote or advance on the job.

Objectives	Measures
8.1 Recognize terms associated with job advancement.	Refer to competency Test Item Bank VEC-T&I-C/TB 7471, 7472, 7473.
8.2 Identify characteristics employers consider in deciding whom to promote.	
8.3 Analyze the difference between good and poor attitudes shown on a job.	
8.4 Explain steps that will help in job advancement.	
8.5 Recognize benefits of additional education and training.	
8.6 Identify sources of additional education and training.	
8.7 Explain activities and/or commitments that will better prepare a person for advancement and responsibility.	
8.8 Explain reasons individuals cannot succeed on a job.	
8.9 Develop a program for self-improvement.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Masonry

COMPETENCY GOAL 9: The learner will explain the free enterprise system, and identify factors that may influence the economy.

Objectives	Measures
9.1 Recognize terms associated with the free enterprise system.	Refer to competency Test Item Bank VEC-T&I-C/TB 7471, 7472, 7473.
9.2 Identify resources necessary for production of goods and services.	
9.3 Identify the roles of government in the economy.	
9.4 Explain the roles of individuals and businesses in the economy.	
9.5 Identify the way prices influence the economy.	
9.6 Identify the benefits of competition and profit.	
9.7 Explain the characteristics of our modified free enterprise system.	
9.8 Describe the ways the government has become involved in the market place.	
9.9 Identify reasons why the government's involvement in the economy has increased.	
9.10 Explain problems created by government involvement in the economy.	

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Grade Level: 10-12 Skills/Subject Area: Masonry

COMPETENCY GOAL 10: The learner will identify the characteristics of a good leader and correctly demonstrate good leadership.

Objectives	Measures
10.1 Describe leadership.	Refer to competency Test Item Bank VEC-T&I-C/TB 7471, 7472, 7473.
10.2 Identify characteristics of a good leader.	
10.3 Identify steps one should follow in becoming a good leader.	
10.4 Identify the value of having leadership ability.	
10.5 Interpret her/his leadership ability after completing the personality self-rating scale.	
10.6 Recognize leaders within the community and identify traits that make them good leaders.	

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Grade Level: 10-12 Skills/Subject Area: Masonry

COMPETENCY GOAL 11: The learner will recognize terms and definitions associated with basic trade arithmetic and calculate problems common to the masonry trade.

Objectives	Measures
11.1 Recognize terms associated with basic trade arithmetic.	Refer to competency Test Item Bank VEC-T&I-C/TB 7471, 7472, 7473.
11.2 Calculate "area" using the correct formulas.	
11.3 Develop basic problems dealing with estimating.	
11.4 Identify the difference between ratio and proportion.	
11.5 Develop basic arithmetic problems.	
11.6 Estimate materials needed for a specific job.	
11.7 Develop basic ratio and proportion problems.	

Grade Level: 10-12 Skills/Subject Area: Masonry

COMPETENCY GOAL 12: The learner will identify and interpret working drawings and specifications.

Objectives	Measures
12.1 Identify terms associated with basic blueprint reading.	Refer to competency Test Item Bank VEC-T&I-C/TB 7471, 7472, 7473.
12.2 Identify types of working drawings.	
12.3 Describe divisions found in a set of building plans.	
12.4 Identify types of lines and symbols.	
12.5 Recognize commonly used abbreviations on blueprints.	
12.6 Recognize measurements on a given architect's scale.	
12.7 Identify major items that may be found on a set of masonry specifications.	
12.8 Identify items that may be shown in detail on a drawing.	
12.9 Show how to read and accurately interpret a set of blueprints and specifications.	

VOCATIONAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Masonry

COMPETENCY GOAL 13: The learner will identify and interpret working drawings and specifications.

Objectives		Measures
13.1	Recognize terms associated with measuring.	Refer to competency Test Item Bank VEC-T&I-C/TB 7471, 7472, 7473.
13.2	Identify basic measuring tools used by the bricklayer.	
13.3	Identify uses of modular and spacing rules.	
13.4	Interpret a standard measuring rule.	
13.5	Describe the procedures for reading modular and spacing rules.	
13.6	Measure objects to the nearest one-sixteenth of an inch.	
13.7	Draw lines and objects to specific dimensions.	
13.8	Make a story pole using a modular rule.	
13.9	Make a story pole using a spacing rule.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Masonry

COMPETENCY GOAL 14: The learner will identify the different types and parts of the builder's level, and demonstrate the ability to set-up, adjust, and read the instrument and rod.

Objectives	Measures
14.1 Recognize terms associated with the builder's level.	Refer to competency Test Item Bank VEC-T&I-C/TB 7471, 7472, 7473.
14.2 Identify the different types of levels.	
14.3 Identify the types of self-reading rods.	
14.4 Identify the parts of the builder's level.	
14.5 Explain the difference between the vertical cross hair and the horizontal cross hair on the builder's level.	
14.6 Identify the parts of the leveling rod.	
14.7 Identify the common errors that contribute to incorrect measurement.	
14.8 Identify rules to follow in providing care of the level.	
14.9 Identify hand motions used by the instrument man to guide the target man when reading the rod.	
14.10 Demonstrate the ability to set-up and adjust the builder's level.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Masonry

COMPETENCY GOAL 15: The learner will demonstrate proper procedure in spreading mortar and laying brick to a line.

Objectives		Measures
15.1	Recognize terms used in activities involved in spreading mortar and laying brick to a line.	Refer to competency Test Item Bank VEC-T&I-C/TB 7471, 7472, 7473.
15.2	Practice picking up mortar from the mortar board.	
15.3	Practice speading mortar in the correct manner.	
15.4	Practice building a four to six inch lead wall.	
15.5	Practice building a four inch corner lead wall, using the level and the steel square.	
15.6	Build several brick projects using the basic masonry tools, e.g., trowel, level, jointer and square.	
15.7	Identify purposes of the masons' line.	
15.8	Identify methods of putting up the line.	
15.9	Build projects that require line work.	

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Grade Level: 10-12 Skills/Subject Area: Masonry

COMPETENCY GOAL 16: The learner will identify methods of wall layout and construction.

Objectives	Measures
16.1 Recognize terms associated with wall layout.	Refer to competency Test Item Bank VEC-T&I-C/TB 7471, 7472, 7473.
16.2 Explain the purposes of bonds.	
16.3 Identify types of bonds.	
16.4 Identify methods of layout.	
16.5 Identify a load-bearing and nonload-bearing wall.	
16.6 Identify types of through-wall bonding.	
16.7 Identify methods of wall protection.	
16.8 Identify types of flashing.	
16.9 Identify the kinds of tooling used in brickwork.	
16.10 Describe the purposes of flashing and tooling.	

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TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Masonry

COMPETENCY GOAL 17: The learner will identify types and parts of chimneys and fireplaces and the materials used in their construction.

Objectives	Measures
17.1 Recognize terms associated with chimneys and fireplaces.	Refer to competency Test Item Bank VEC-T&I-C/TB 7471, 7472, 7473.
17.2 Identify types of fireplaces.	
17.3 Identify parts of a fireplace.	
17.4 Recognize the proper factors to consider in constructing fireplaces and chimneys.	
17.5 Describe the procedure for buttering a firebrick.	
17.6 Explain the difference between firebrick mortar and brick mortar.	
17.7 Identify the characteristics of firebrick.	
17.8 Recognize the proper characteristics of a firebox.	
17.9 Build a firebox and a fireplace.	

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Grade Level: 10-12 Skills/Subject Area: Masonry

COMPETENCY GOAL 18: The learner will identify types of stone, the procedures for setting, layout, bonding, and the precautions to take when handling stone.

Objectives	Measures
18.1 Identify types of stone.	Refer to competency Test Item Bank VEC-T&I-C/TB 7471, 7472, 7473.
18.2 Describe the procedure for laying out stone.	
18.3 Describe the procedure for bonding stone.	
18.4 Recognize types of anchors used in setting stone.	
18.5 Identify reasons for installing flashing.	
18.6 Recognize reasons for using insulation.	
18.7 Identify types of expansion and control joints and reasons for their use.	
18.8 Identify precautions to observe when unloading and storing stone.	
18.9 Identify factors to consider when setting stone.	
18.10 Identify methods of handling stone.	

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Grade Level: 10-12 Skills/Subject Area: Masonry

COMPETENCY GOAL 19: The learner will identify the purposes of various kinds of construction layout, and describe the procedures used for erecting various kinds of materials.

Objectives	Measures
19.1 Identify the terms associated with layout and construction.	Refer to competency Test Item Bank VEC-T&I-C/TB 7471, 7472, 7473.
19.2 Identify the types and purposes of arches.	
19.3 Identify the purposes of masonry paving.	
19.4 Identify types and purposes of structural tile.	
19.5 Identify types and purposes of pre-cast panels.	
19.6 Describe procedures for erecting panels or pre-fab units.	
19.7 Identify the types and purposes of grouting.	
19.8 Identify factors to consider when building cavity walls.	
19.9 Recognize the purposes and methods of applying insulation.	

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Grade Level: 10-12 Skills/Subject Area: Masonry

COMPETENCY GOAL 20: The learner will operate a basic oxyacetylene cutting outfit safely.

Objectives	Measures
20.1 Recognize the terms associated with basic gas cutting.	Refer to competency Test Item Bank VEC-T&I-C/TB 7471, 7472, 7473.
20.2 Identify the parts of an oxyacetylene cutting outfit.	
20.3 Identify the parts of the torch body and cutting attachment.	
20.4 Identify the types of oxyacetylene cutting flames.	
20.5 Identify reasons for poor cut.	
20.6 Recognize causes of backfire.	
20.7 Describe what happens when a backfire occurs.	
20.8 Describe what happens when a flashback occurs.	
20.9 Identify, in the proper order, the steps to follow in case of a flashback.	
20.10 Demonstrate the proper use of oxyacetylene equipment.	

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Grade Level: 10-12 Skills/Subject Area: Masonry

COMPETENCY GOAL 21: The learner will operate basic arc welding equipment safely.

Objectives	Measures
21.1 Match terms associated with arc welding with the correct definitions.	Refer to competency Test Item Bank VEC-T&I-C/TB 7471, 7472, 7473.
21.2 Identify types of electrodes.	
21.3 Identify the common equipment used in arc welding, the common sizes of electrodes, and the purposes of electrode coating.	
21.4 Identify the meanings of the numbers in the electrode classification system.	
21.5 Identify factors to consider in selecting electrodes.	
21.6 Explain the effects of raising and lowering the arc welding current.	
21.7 Identify two methods of striking an arc.	
21.8 Recognize characteristics of proper arc length.	
21.9 Identify the parts of a drawing showing the welding process.	
21.10 Identify kinds of welds and types of weld joints.	

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Grade Level: 10-12 Skills/Subject Area: Masonry

COMPETENCY GOAL 22: The learner will show how to correctly clean, point, caulk, and waterproof masonry units.

Objectives	Measures
22.1 Recognize terms associated with cleaning, pointing, and caulking.	Refer to competency Test Item Bank VEC-T&I-C/TB 7471, 7472, 7473.
22.2 Identify purposes of cleaning.	
22.3 Demonstrate cleaning equipment.	
22.4 Describe the cleaning procedure.	
22.5 Use safety precautions when cleaning masonry units.	
22.6 Describe the procedure for pointing.	
22.7 Explain the difference between pointing mortar and brick mortar.	
22.8 Recognize the purposes of caulking.	
22.9 Match the types of caulking to specific uses.	
22.10 Identify the purposes and methods of waterproofing.	

Plumbing Outline

1. Orientation
    a. Nature of the trade
    b. Introduction to residential plumbing

2. Business Relationships
    a. Employer/employee relations
    b. Employee/customer relations

3. Safety
    a. Personal safety
    b. Safety color coding
    c. Fire safety
    d. Procedures in case of accident

4. Applying for a Job
    a. Locating a job
    b. Making an application
    c. Interview techniques

5. Identification of Tools and Equipment
    a. Use of hand tools and equipment
    b. Measurement
    c. Care of tools and equipment

6. Power Tools
    a. Selecting the proper tool
    b. Power tool safety
    c. Power tool maintenance

7. Use of Equipment
    a. Acetylene equipment
    b. Excavating equipment
    c. Testing equipment

8. Designing a Tool Box
    a. Company provided tools
    b. Employee provided tools
    c. Make a tool list for the trade

9. Vehicle and Inventory

    a. Maintenance of vehicle
    b. Vehicle inventory

10. Reading Job Plans

    a. Symbols in print reading
    b. Site plans
    c. Identifying materials from job prints

11. Isometric Sketching

    a. Sketching plumbing layouts
    b. Making a materials list

12. Estimating

    a. Bathroom layout
    b. Other piping layouts
    c. Change orders

13. Plumbing Code

    a. Legislation
    b. Inspection
    c. Application

14. Metric System

    a. Conversions--English to metric
    b. Demonstrate ability to use metrics

15. Drainage Systems

    a. Identification of parts
    b. Safety
    c. Waste and vent
    d. Installation

16. Water Supply System

    a. Components
    b. Types of piping
    c. Rough in to fixtures
    d. Testing for leaks

17. Joining Piping System

    a. Different types
    b. Uses of each
    c. Installation using combination types

18. Pipe Fittings

    a. Types
    b. Selection
    c. Installation

19. Residential Piping

    a. Selection
    b. Code requirements

20. Private Water Systems

    a. Pumps and controls
    b. Installation

21. Septic and Field Lines

    a. Operation of septic system
    b. Components
    c. Building codes
    d. Maintenance of system

22. Water Treatments

    a. Water analysis
    b. Purification systems
    c. Preparing a water sample

23. Residential Gas System

    a. Natural and manufactured gas
    b. Piping
    c. Installation and testing

24. Installation of Fixtures and Appliances

    a. Spa and sprinkler systems
    b. Sprinkler system design

25. Valves and Faucets

    a. Identification and selection
    b. Installation
    c. Maintenance

26. Drainage Connections

    a. Fixture trap installations
    b. Closet flange installations

27. Fixtures and Appliances

    a. Residential applications
    b. Installation of residential fixtures and appliances

28. Water System Maintenance and Repair

    a. Water system repair
    b. Fixtures repair

29. Drainage System Repair

    a. Clearing drainage systems
    b. Safety

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 1: The learner will identify the nature of plumbing as a trade and its occupational outlook.

Objectives		Measures
1.1	List the terms associated with residential plumbing.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
1.2	Identify important events and specify dates in the development of the history of residential plumbing.	
1.3	List occupational fields related to residential plumbing.	
1.4	State the future need for skilled people in the plumbing occupations.	

Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 2: The learner will discuss the important aspects of good employer/employee relationships, employee/customer relationships, and teamwork. "Prepare a chart showing percentage cost analysis of a job" should ideally be another goal, but in any case in not even listed under the objectives.

Objectives	Measures
2.1 List desirable attitudes in an employer/employee relationship.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
2.2 Describe desirable traits in a good employee.	
2.3 Explain what teamwork means on the job.	
2.4 Describe how employee/customer relationships affect a business.	

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Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 3: The learner will follow safety practices in the shop and in the field and be able to demonstrate how to cope with emergencies.

Objectives	Measures
3.1 List several shop hazards and explain how they may be prevented.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
3.2 List rules for personal safety.	
3.3 Tell how fires may be accidentally started, the different types of fires, and how to deal with each.	
3.4 Describe how the safety color code would be applied in an actual installation.	
3.5 Demonstrate what procedure would be necessary in each type of fire.	
3.6 Describe procedure to follow in case of an accident.	

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Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 4: The learner will make decisions on types of jobs, locations of jobs, applications, and interview techniques.

Objectives		Measures
4.1	List places to look for job openings.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
4.2	List types of job openings best suited for applicant's physical and mental qualifications and prepare a short resume for a job interview.	
4.3	Demonstrate an ability to handle jobs, future assignments, and interviews.	
4.4	State how to question interviewer as to job benefits and how best to close the interview.	

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TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 5: The learner will identify basic hand tools and demonstrate their proper use and care.

	Objectives	Measures
5.1	List hand tools used only in the plumbing trade and other tools necessary in the trade.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
5.2	Decide which tools a worker should own and which tools an employer should furnish.	
5.3	Demonstrate the ability to read a rule and to use various hand tools properly.	
5.4	Describe the proper care of various hand tools.	

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Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 6: The learner will identify power tools used in the plumbing trade and demonstrate the ability to use these tools properly.

	Objectives	Measures
6.1	Demonstrate the ability to use the proper power tools for specific jobs.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
6.2	State safety precautions for each type of tool.	
6.3	Describe the need for clean tools and shop areas.	
6.4	Make a job sheet and list all materials and tools needed on the job site.	
6.5	Describe tools used specifically for maintenance and repairs to plumbing systems.	

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Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 7: The learner will identify and correctly use the equipment used in residential plumbing.

Objectives		Measures
7.1	Demonstrate the use of an acetylene torch and list the safety precautions relating to its use.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
7.2	List other equipment used in residential plumbing and describe its use.	
7.3	Describe hand and power excavating equipment used in residential plumbing.	
7.4	Describe the procedure for testing a plumbing system.	

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Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 8: The learner will design a tool box and select the tools which should be included in the box for residential plumbing.

Objectives	Measures
8.1 List tools which the employee should furnish.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
8.2 List tools the employer should furnish.	
8.3 List specialty tools.	
8.4 Describe the proper condition of tools when in use and during storage.	
8.5 Describe the condition the work area should be in at all times.	

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TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12　　　　Skills/Subject Area: Plumbing

COMPETENCY GOAL 9: The learner will describe the routine maintenance procedures associated with a plumbing truck, and know where tools and equipment should be stored.

	Objectives	Measures
9.1	State how a check list would be practical in maintaining a plumbing truck.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
9.2	Describe where tools, equipment, and materials should be stored.	
9.3	List tools and equipment which would be carried at all times on the truck.	
9.4	List tools and equipment which would be carried on a temporary basis.	
9.5	Make a checklist for daily, weekly, and monthly maintenance of a plumbing truck.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 10: The learner will identify symbols and terms used by architects.

Objectives	Measures
10.1 State the method used by architects to show the contour of building sites.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
10.2 Demonstrate the ability to read a scale rule and measure lines.	
10.3 Identify plumbing symbols for fixtures and piping.	
10.4 Describe the materials in a building (e.g., outside and inside walls, floors, ceilings, and roof) from a blueprint.	

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TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 11: The learner will state the terms used in isometric sketching and describe how each is used in building a structure.

Objectives		Measures
11.1	Draw a sketch showing isometric direction and angles.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
11.2	Draw a three dimensional room and use isometrics to install the piping for a plumbing fixture using a scaled house plan.	
11.3	Draw an isometric of the water and draw pipes of a full bathroom from a house plan to a point outside the room.	
11.4	List the pipe and fittings, by size and description, necessary to install the plumbing in the bathroom.	

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Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 12: The learner will decide from plans of a house where plumbing fixtures should be placed and from manufacturer's rough-in sheets acquire the information necessary to install the piping in the correct locations for the fixtures.

Objectives	Measures
12.1 Draw a bathroom to scale i.e., ¼" = 1' and locate the center of each fixture using a scale rule.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
12.2 Decide where water pipes and drain pipes should be located.	
12.3 Design the piping systems to a point outside the house. All water piping and drain, waste, and vent piping should be shown.	
12.4 Compare the rough-in of a slab house to a house with a crawl space.	
12.5 Select the correct procedure as dictated by a change order.	
12.6 Draw an isometric of the entire system.	

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Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 13: The learner will discuss the need for a plumbing code and how it is administered.

Objectives	Measures
13.1 List health hazards of the past which led to our modern plumbing code.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
13.2 List types of codes and laws which protect people's health and safety.	
13.3 Describe the legislative authority governing the building and plumbing codes.	
13.4 State the purpose of the twenty-two principles of plumbing.	
13.5 State how the code applies to quality and materials.	
13.6 Describe the purpose of traps and vents.	
13.7 Describe how inspection of a plumbing system benefits the customer, the contractor, and the plumber.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 14: The learner will identify the terms used in English measurements and in metric measurements. Convert English measurements into metric, and metric into English.

Objectives	Measures
14.1 Discuss the history of metrics.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
14.2 List metric terms for length, weight, liquids, and temperature.	
14.3 Demonstrate the ability to use metrics.	

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Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 15: The learner will identify and describe all parts of a drainage system and discuss the installation of the system, including safety precautions.

	Objectives	Measures
15.1	Draw an isometric of a drainage system and identify the three parts, stating the function of each.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
15.2	Discuss why certain fittings are used and others are prohibited.	
15.3	Discuss methods of hanging different types of pipe and the hangers for each.	
15.4	Discuss the installation of underground piping, and the hazards and safety precautions associated with trenching.	
15.5	Discuss remodeling and additions to an old system.	
15.6	Demonstrate the ability to install each type of fixture with drain, waste, and vent piping.	
15.7	Demonstrate the ability to install the house drain with proper grade and hangers.	

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Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 16: The learner will identify all components of a water system and size the pipes of a one- and a two-story house and describe methods of testing.

	Objectives	Measures
16.1	List all valves and components in a single story house and state use of each.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
16.2	Identify the terms used in water supply systems and how each affects the system.	
16.3	Compare the types of piping used for water supplies and discuss the advantages and disadvantages of each.	
16.4	Discuss pipe insulation for prevention of frozen pipes.	
16.5	Draw isometric of hot and cold pipes in a two-story house and size all pipes.	
16.6	Describe methods of testing water pipes for leaks.	
16.7	Demonstrate ability to rough-in water pipes to house fixtures.	

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Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 17: The learner will identify tools and equipment necessary to join the various types of piping used in residential construction.

Objectives	Measures
17.1 List the different types of piping used in plumbing and describe the methods of joining each type.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
17.2 State the uses of each type of pipe.	
17.3 Demonstrate the ability to cut and join all types of pipes, using the various methods of joining, with the proper tools.	

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Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 18: The learner will identify pipe and fittings used in the various types of systems, and the specific application of these fittings in these systems.

Objectives	Measures
18.1 Describe the types of piping and the terms used to identify the fittings in each type.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
18.2 Demonstrate the ability to determine pipe and fitting size.	
18.3 Demonstrate the ability to use the proper fittings in a plumbing system.	

Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 19: The learner will identify types of pipe used in residential plumbing and discuss the advantages and disadvantages of each.

Objectives	Measures
19.1 List types of pipes and the general uses of each type in residential plumbing.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
19.2 List advantages and disadvantages of each type.	
19.3 Discuss how the State Plumbing Code regulates the types of pipe in residential plumbing.	

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Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 20: The learner will identify types of water pumps, controls, and water supplies used with private water systems. Describe operating principles and correctly install a water pump.

	Objectives	Measures
20.1	List the terms relative to water systems and explain each.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
20.2	List the types of wells and describe each.	
20.3	List the types of pumps and describe how each operates.	
20.4	Describe the types of controls and accessories and their operating features.	
20.5	Demonstrate the ability to install a pump according to the manufacturers' specifications.	

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Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 21: The learner will describe the installation of a septic tank and field lines and explain how they operate.

Objectives		Measures
21.1	Identify terms used in septic tank installation and operation.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
21.2	Describe the operation of the septic system.	
21.3	Draw a side view of a septic system showing all parts and measurements.	
21.4	State how size of tank and length of lines are determined, and by what agency.	
21.5	Describe the location of the septic system in relation to hot lines, buildings, and water systems.	
21.6	Describe the care of the septic system.	

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Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 22: The learner will identify methods of water treatment and the control of water quality.

Objectives	Measures
22.1 Identify terms and chemicals used in water analysis and treatment.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
22.2 State conditions under which water would need treatment.	
22.3 List methods used to purify water.	
22.4 List methods used in water treatment.	
22.5 Demonstrate the ability to prepare a water sample for analysis by a laboratory.	

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Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 23: The learner will demonstrate the ability to identify materials and to install, size, and test a gas residential piping system.

Objectives		Measures
23.1	Identify terms associated with natural and manufactured gas.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
23.2	Identify pipe and fittings used in gas piping and the methods of joining each type.	
23.3	Describe method of sizing gas piping according to demand.	
23.4	List valves and meters necessary to measure and control the flow of gas.	
23.5	Demonstrate the ability to install a residential gas system and test the system conforming to local codes.	

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Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 24: The learner will describe the installation and operation of a residential spa and design a residential sprinkler system.

Objectives	Measures
24.1 List the components of a residential spa and describe the uses of each.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
24.2 Describe the installation and function of a spa.	
24.3 Identify the type of pipe fittings and methods of installing a sprinkler system.	
24.4 List the water sources and types of pressure sources available for sprinkler systems.	
24.5 Design a sprinkler system per a residential plot plan, using an adequate water source.	

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Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 25: The learner will identify and demonstrate various types of valves and faucets.

Objectives		Measures
25.1	List terms associated with valves and faucets.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
25.2	State the uses of the various types of valves and faucets in the plumbing system.	
25.3	Demonstrate method of repair by disassembling and reassembling a single lever kitchen sink faucet.	
25.4	Demonstrate the ability to install a valve in a copper water line and a lavatory faucet with a pop-up drain on a lavatory.	

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Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 26: The learner will identify various terms associated with drainage connections and identify various types of drainage connections in a residential plumbing system.

Objectives	Measures
26.1 Discuss terms used in drainage systems.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
26.2 List types of fixture traps and connections.	
26.3 List types of pipe used in residential drainage systems.	
26.4 List special tools associated with each type of pipe.	
26.5 Demonstrate the ability to install a closet flange to cast iron and to plastic pipe.	

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Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 27: The learner will identify various types of fixtures and appliances and apply correct installation methods to each.

Objectives	Measures
27.1 Identify terms and installation materials associated with plumbing fixtures and appliances.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
27.2 List the various fixtures and appliances used in a residence.	
27.3 Discuss how local plumbing codes affect the installation of fixtures and appliances in a residence.	
27.4 Discuss the various designs and models available in fixtures and appliances.	
27.5 Demonstrate the ability to install all fixtures necessary to complete a residential plumbing system.	

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Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 28: The learner will identify terms associated with repair and maintenance of a water system, fixtures, and sections of a plumbing system.

Objectives	Measures
28.1 Discuss terms and definitions used in the maintenance of a water system.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
28.2 Demonstrate methods of thawing and repairing frozen pipes.	
28.3 Describe methods of making temporary emergency repairs.	
28.4 Demonstrate knowledge of water pump systems by replacing a pressure control switch.	
28.5 Demonstrate the ability to repair various valves on plumbing fixtures.	
28.6 Demonstrate the ability to replace a gas water heater and insulate the water pipes.	

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Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 29: The learner will identify terms and equipment used in maintenance and repair of drainage systems, and identify access points in the system for removing stoppages.

Objectives		Measures
29.1	Describe the terms, tools, and materials used to clear drains.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
29.2	Identify cleanout points and demonstrate tools for each.	
29.3	Demonstrate the use of chemicals to clear drains and state damages associated with the use of chemicals.	
29.4	Demonstrate replacement of a trap.	
29.5	Demonstrate methods of clearing obstructions in water closet drains.	

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Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 30: The learner will identify characteristics of a good leader.

Objectives	Measures
30.1 Define "leadership."	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
30.2 Name characteristics of a good leader.	
30.3 Identify selected leaders within the community and list three factors that identify each as a leader.	

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Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 31: The learner will demonstrate an understanding of parliamentary procedure.

Objectives	Measures
31.1 Describe the importance of, and use of, parliamentary procedure.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
31.2 List the items of a business agenda.	

Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 32: The learner will perform correctly seventeen parliamentary procedure abilities.

Objectives	Measures
32.1 Demonstrate the following parliamentary procedure abilities: main motion, amend, previous question, point of order, nominations and elections, and adjourn.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
32.2 Demonstrate the following parliamentary procedure abilities: appeal from decision of the chair, lay on the table, take from the table, refer to committee, and parliamentary inquiry.	
32.3 Demonstrate the following parliamentary procedure abilities: suspend standing rules, division of assembly, leave to withdraw a motion, reconsider, rescind, and call for orders of the day.	

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Grade Level: 10-12 Skills/Subject Area: Plumbing

COMPETENCY GOAL 33: The learner will participate in a youth club meeting (VICA).

Objectives	Measures
33.1 Preside over a VICA business meeting.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7591, 7592, 7593.
33.2 Preside over a VICA committee meeting.	

Sheet Metal Outline

1. Orientation

    a. Historical significance
    b. Sheet metal terms
    c. Job opportunities
    d. Job attitudes

2. Safety

    a. Safety terms
    b. Housekeeping
    c. Tools and equipment

3. Mathematics

    a. Measuring
    b. Geometric terms
    c. Scaled drawings

4. Materials

    a. Sheet metal terms
    b. Types of metals

5. Hand Tools

    a. Drawing equipment
    b. Types of hand tools
    c. Shaping tools
    d. Safety

6. Concepts

    a. Seams, locks, edges, and notches
    b. Fasteners and hardware
    c. Methods of development
    d. Geometric constructing
    e. Soldering
    f. Grinding/polishing

7. Leadership Development

    a. Characteristics of a good leader
    b. Parliamentary procedure
    c. VICA participation

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Sheet Metal

COMPETENCY GOAL 1: The learner will discuss the historical significance of metal, list sheet metal job opportunities, and discuss positive job attitude and responsibilities.

Objectives	Measures
1.1 Match sheet metal orientation terms with definitions.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7861, 7862, 7863.
1.2 State the historical significance of metal.	
1.3 List four job opportunities for sheet metal workers.	
1.4 Compare job attitudes.	
1.5 Describe the relationship and responsibilities of the employer and employee.	

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Grade Level: 10-12 Skills/Subject Area: Sheet Metal

COMPETENCY GOAL 2: The learner will be familiar with safe work clothing, the safe use of tools and equipment, ladder safety rules, the most common sheet metal injuries, and will make the student safety pledge related to sheet metal work.

Objectives	Measures
2.1 Match safety terms with definitions.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7861, 7862, 7863.
2.2 Describe and identify sheet metal accidents.	
2.3 Select and complete statement for housekeeping, use of tools and equipment, and safety.	
2.4 Identify classes of fires and tell how to extinguish each class of fire.	
2.5 Describe problems concerning ladder safety (OSHA) and sheet metal first aid.	

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Grade Level: 10-12 Skills/Subject Area: Sheet Metal

COMPETENCY GOAL 3: The learner will list and define basic mathematic and geometric terms, draw and read the sheet metal rule and architect's scale, and perform adding, subtracting, and multiplying of whole numbers, fractions, and decimals.

Objectives	Measures
3.1 Match all basic math terms with their correct definitions.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7861, 7862, 7863.
3.2 List two uses of fractions and complete definitions and true statements for fractions, decimals, and percentages.	
3.3 Compare the architect's scale and the sheet metal layout rule and read both scales.	
3.4 Describe, list, and solve all basic geometric problems.	
3.5 Demonstrate the ability to do all math problems and measurements.	

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Grade Level: 10-12 Skills/Subject Area: Sheet Metal

COMPETENCY GOAL 4: The learner will examine, feel, compare, and determine the proper type of sheet metal materials required in a specific job.

Objectives	Measures
4.1 Identify sheet metal terms relating to sight and feel, and match them with their definitions.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7861, 7862, 7863.
4.2 Draw charts showing the most commonly and least commonly used metals for sheet metal work, and list four advantages in the use of trade tables.	
4.3 Use metal gauges and trade tables to match, arrange, and identify specific metals with a 100% accuracy.	

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Grade Level: 10-12 Skills/Subject Area: Sheet Metal

COMPETENCY GOAL 5: The learner will identify and explain the use of measuring tools and other hand tools used in sheet metal work.

Objectives	Measures
5.1 Explain the difference between these measuring tools: dividers, square, protractors, and standard metal gauges.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7861, 7862, 7863.
5.2 Define and state the use for these hand tools: sheet metal snips, scratch awl, punches, rivet set, dolly bars, cold chisel, hammers, pipe crimper, hand seamer, and clip punch.	
5.3 State the use of these hand tools: hand notcher, dove tailer, duct stretcher, files, and hack saws.	
5.4 Know and define these hand tools: standard screwdriver, phillips screwdriver, pliers, adjustable wrench, stakes, stake plate, pop rivet gun, and hand groover.	

Grade Level: 10-12 Skills/Subject Area: Sheet Metal

COMPETENCY GOAL 6: The learner will identify the seams, locks, clips, edges, and notches commonly used in sheet metal work.

Objectives	Measures
6.1 Define the following terms: seams, clips, locks, edges, and notches.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7861, 7862, 7863.
6.2 Summarize the use and function of seams, clips, locks, edges, and notches.	

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Grade Level: 10-12 Skills/Subject Area: Sheet Metal

COMPETENCY GOAL 7: The learner will list and identify the bench tools, portable power tools, and manual and power operated foot tools used in sheet metal work.

Objectives	Measures
7.1 Identify and describe types of: machine tools, bench tools, portable power tools, and manual and power operated floor tools.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7861, 7862, 7863.
7.2 Demonstrate the ability to use the bar-folder, squaring shears, ship roller, and spot welder.	
7.3 Identify and demonstrate the ability to operate the following machines: rotary machine, hand brake, Pittsburg machine, and cleat bender.	
7.4 Layout and form up a round duct and a one piece rectangular duct.	

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Grade Level: 10-12 Skills/Subject Area: Sheet Metal

COMPETENCY GOAL 8: The learner will identify types of screws, bolts, washers, nuts, and rivets used in sheet work.

Objectives	Measures
8.1 Identify types of screws, bolts, washer, nuts, and rivets.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7861, 7862, 7863.
8.2 Select true statements, or complete complete statements concerning riveting.	
8.3 Explain and identify basic nonmechanical fastening materials such as flexible duct connector, turring vanes, air scopes, and damper quadrants.	
8.4 Demonstrate the ability to layout a simple box with metal rivet and pop rivets.	
8.5 Layout a cylinder and a rectangular dust and install a damper.	
8.6 Install a damper and a quadrant in a rectangular duct.	
8.7 Layout, cut, and install a damper in a round duct.	

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Grade Level: 10-12 Skills/Subject Area: Sheet Metal

COMPETENCY GOAL 9: The learner will list requirements for pattern layout drafting boards, T-squares, compasses, and other pattern layout drafting tools, and define and describe sheet metal layout tools.

Objectives	Measures
9.1 Match terms related to drafting and layout tools with their definition.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7861, 7862, 7863.
9.2 Complete a statement for pattern layout drafting boards and select true statements for T-square requirements.	
9.3 Name the types of compasses used most frequently in pattern layout drawings and for transferring a pattern layout to metal.	
9.4 Match noncompass layout tools with layout drawings and select those required for trasferring a pattern layout to metal.	
9.5 Become competent in the reading of pattern layout drawings and in the ability to transfer a pattern layout to metal.	
9.6 Prepare drafting board, and use compasses and protractor to draw circles, arcs, angles, and divide lines.	

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Grade Level: 10-12 Skills/Subject Area: Sheet Metal

COMPETENCY GOAL 10: The learner will identify basic geometric constructions, list the steps in their construction, and draw a basic geometric construction giving lines and circles.

Objectives	Measures
10.1 Match geometric construction terms with their definitions.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7861, 7862, 7863.
10.2 Bisect a straight line and an angle.	
10.3 Erect a perpendicular at the end of a straight line and form a given point on a line.	
10.4 Identify parts of a circle.	
10.5 Pass an arc of a given radius through two given points and through three given points.	
10.6 Inscribe a circle within a triangle.	
10.7 Divide a circle into six and twelve equal parts.	
10.8 Construct parallel lines and an equilateral triangle with a known latitude.	
10.9 With the use of a compass, find the center of a circle.	
10.10 Construct a two-view and a three-view drawing.	

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Grade Level: 10-12 Skills/Subject Area: Sheet Metal

COMPETENCY GOAL 11: The learner will use parallel lines, radial lines, triangulation, and combination method of development to complete basic and complex sheet and layout, and form to specifications (x) numbers of sheet metal patterns.

Objectives	Measures
11.1 Match terms and symbols related to methods of development with definition.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7861, 7862, 7863.
11.2 Layout a box and a rectangular duct, to a given dimension.	
11.3 Use parallel and straight line development to layout a square 90° elbow, and a square transitional 90° elbow.	
11.4 With the use of parallel and radial line development, layout all 90° elbows with either square or curved back and throat.	
11.5 Layout a two-way "Y" branch and a straight line offset with the use of parallel line development.	
11.6 Layout a plain offset with curved heel and throat and a O.G. transition offset with the use of radial line development.	
11.7 Layout a straight line transit with three straight sides and transition with two straight edges with the use of parallel line development.	

Skills/Subject Area: Sheet Metal

COMPETENCY GOAL 11: The learner will use parallel lines, radial lines, triangulation, and combination method of development to complete basic and complex sheet and layout, and form to specifications (x) numbers of sheet metal patterns.

Objectives	Measures
11.8 Layout a cylinder, cut one on a midder, one cut oblique to axis, and one with both surfaces cut on a midder.	
11.9 Layout a two-piece 45° elbow and a three-piece 90° elbow.	
11.10 Layout a cone, with a cutaway part, a cone cut oblique on the axis, a notched cone, a cone notch at both open ends, and one notch at both ends.	
11.11 Layout a pyramid with a center taper that is square, rectangular, and one cut oblique to the axis. Layout a hexagonal pyramid with the top cut oblique to the axis.	
11.12 Layout a square to square twist and a square to square reducer in one piece.	
11.13 Layout a square to round, a rectangle to round with two sides straight, one with the round larger than the two short sides, one off center, and square to round fitting one way off center.	
11.14 Layout a series of drope-cheek elbows with a rectangle to round with a pitch at the top.	

Skills/Subject Area: Sheet Metal

COMPETENCY GOAL 11: The learner will use parallel lines, radial lines, triangulation, and combination method of development to complete basic and complex sheet and layout, and form to specifications (x) numbers of sheet metal patterns.

Objectives	Measures
11.15 Layout a 90° "Y" branch and a 90° "Y" branch and offset combination.	
11.16 Layout a rectangle to round offset, a transition "Y" branch, a cone intersecting a cylinder, and a round reducing offset.	

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Grade Level: 10-12 Skills/Subject Area: Sheet Metal

COMPETENCY GOAL 12: The learner will list types of architectural drawings and their uses, identify basic sheet metal symbols, define methods for presetting duct work in blueprints and working drawings, list the procedure for making a working drawing, and prepare a duct work materials list from a working drawing.

Objectives	Measures
12.1 Match definitions with terms related to blueprint reading and uniform building codes. Complete statements concerning how to use a working drawing.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7861, 7862, 7863.
12.2 Draw a chart showing typical arrangements of residential and commercial working drawings.	
12.3 Identify basic sheet metal symbols.	
12.4 List three common scales used in architectural drawings, and arrange in order the steps in reading a scale ration of 1/4" = 1'-0".	
12.5 Arrange, in order, the steps in preparing a materials list from a working drawing.	
12.6 Complete statements concerning uniform building codes and their purpose, and tell how the codes are enforced.	
12.7 Compare a duct work material list from a working drawing for a 32'x56' residence.	

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Grade Level: 10-12 Skills/Subject Area: Sheet Metal

COMPETENCY GOAL 13: The learner will explain the process of soldering, the rules for proper maintenance of soldering equipment, and all soldering safety rules.

Objectives	Measures
13.1 List uses of soldering, and complete a statement concerning solder characteristics, flux, acids, soldering coppers, and guidelines for keeping solder coppers clean.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7861, 7862, 7863.
13.2 Complete statements concerning furnaces for heating coppers, safety rules for lighting furnaces to properly maintain soldering technique, and old fundamentals.	
13.3 Select true statements concerning the following: proper tong gap, welding low carbon steel, medium carbon steel, guidelines for welding stainless steel, and dip costed or plated steel aluminum.	
13.4 Demonstrate the ability to: forge, shape ten soldering copper, prepare galvanized metal with raw acid, solder a vertical seam, adjust tong pressure, and conduct a visual mechanical test.	

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Grade Level: 10-12 Skills/Subject Area: Sheet Metal

COMPETENCY GOAL 14: The learner will match grinding and polishing terms with their correct definitions.

Objectives	Measures
14.1 List rules of thumb for grinding and polishing. List special grinding and polishing tools for stainless steel.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7861, 7862, 7863.
14.2 Demonstrate the ability to grind a welded seam to a smooth finish, and grind and polish a stainless steel seam to a high luster finish.	

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Grade Level: 10-12 Skills/Subject Area: Sheet Metal

COMPETENCY GOAL 15: The learner will discuss the characteristics of flexible, rigid, and exterior duct liners and wrips, and select the proper staple gun and staples.

Objectives	Measures
15.1 Match terms related to duct liners and insulation with definitions.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7861, 7862, 7863.
15.2 Complete statements concerning the characteristics of duct liner applications for rigid exterior, unfixed, fixed, and parallel ducts.	
15.3 Complete statement concerning characteristics of a duct board and a flexible round duct.	
15.4 Demonstrate the ability to install liner in a rectangular duct, and cut and form a one piece v-groove duct from fiberglass duct.	

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Grade Level: 10-12 Skills/Subject Area: Sheet Metal

COMPETENCY GOAL 16: The learner will use parallel line, radial line, triangulation, combination methods of development, and standard procedures for measurement transfer, to complete advanced sheet metal layout.

Objectives	Measures
16.1 Layout to a given dimension an O.G.: transitional offset, a double offset with a single center line, a change offset, a tapering offset, a double center line, and a transition with three sides straight.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7861, 7862, 7863.
16.2 Layout to a given dimension, a "T" joint that intersects a cylinder at: a 45° angle, a round "T" on a 90° off center, a "T" at a 45° off center, and a rectangular "T" intersecting a cylinder at a 45° angle.	
16.3 Layout, to a given dimension, a round reducer on center taper and a round to round.	
16.4 Layout, to a given dimension, these "Y" branches: a three way "Y" branch round to round, a round three way "Y" branch, a three way "Y" branch with all branches having different diameters, and a "Y" branch with collars connected to each branch on a midder.	

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TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Sheet Metal

COMPETENCY GOAL 17: The learner will identify characteristics of a good leader.

Objectives	Measures
17.1 Define "leadership."	Refer to Competency Test Item Bank VEC-T&I-C/TB 7861, 7862, 7863.
17.2 Name characteristics of a good leader.	
17.3 Identify selected leaders within the community and list three factors that identify each as a leader.	

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Grade Level: 10-12 Skills/Subject Area: Sheet Metal

COMPETENCY GOAL 18: The learner will demonstrate an understanding of parliamentary procedure.

Objectives	Measures
18.1 Describe the importance of, and use of, parliamentary procedure.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7861, 7862, 7863.
18.2 List the items of a business agenda.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Sheet Metal

COMPETENCY GOAL 19: The learner will correctly perform seventeen rules of parliamentary procedure.

Objectives	Measures
19.1 Demonstrate the following parliamentary procedure abilities: main motion, amend, previous question, point of order, nominations and elections, and adjourn.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7861, 7862, 7863.
19.2 Demonstrate the following parliamentary procedure abilities: appeal from decision of the chair, lay on the table, take from the table, refer to committee, and parliamentary inquiry.	
19.3 Demonstrate the following parliamentary procedure abilities: suspend standing rules, division of assembly, leave to withdraw a motion, reconsider, rescind, and call for orders of the day.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Sheet Metal

COMPETENCY GOAL 20: The learner will participate in a youth club meeting (VICA).

Objectives	Measures
20.1 Preside over a VICA business meeting.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7861, 7862, 7863.
20.2 Preside over a VICA committee meeting.	

Small Gasoline Engines Outline

1. Orientation

    a. Job opportunities
    b. Job attitudes
    c. Terms

2. Safety

    a. Safety terms
    b. Housekeeping
    c. Tools and equipment

3. Tools

    a. Hand tools
    b. Maintenance
    c. Safety

4. Mathematics

    a. Measuring
    b. Terms/calculations
    c. Measuring tools

5. Engine Identification

    a. Inspection
    b. Types

6. Engine Principles

    a. Energy
    b. Horsepower
    c. Torque
    d. Cubic inch displacement
    e. Calculation of 2/4 stroke engines

7. Basic Electricity

    a. Magnetism/electricity
    b. Circuits
    c. Trouble shooting
    d. AC/DC current

8. Systems

   a. Ignition
   b. Trouble shooting
   c. Charging systems
   d. Starting
   e. Lubrication
   f. Cooling systems
   g. Fuel systems
   h. Exhaust systems

9. Leadership Development

   a. Characteristics of a good leader
   b. Parliamentary procedure
   c. VICA participation

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Small Gasoline Engines

COMPETENCY GOAL 1: The learner will list places of employment, name the steps involved in small gas engine shop work, and complete a personal information form.

Objectives		Measures
1.1	List three areas of employment for small engine mechanics.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7431, 7432, 7433.
1.2	Name seven steps involved in small gas engine shop work.	
1.3	Complete a personal information form.	

VOCATIONAL EDUCATION
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Grade Level: 10-12 Skills/Subject Area: Small Gasoline Engines

COMPETENCY GOAL 2: The learner will be able to recognize and follow acceptable safety practices.

Objectives	Measures
2.1 Match terms associated with safety to the correct definitions.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7431, 7432, 7433.
2.2 List regulations for maintaining a safe and orderly shop.	
2.3 Distinguish between safe and unsafe shop practices.	
2.4 List the four general shop safety rules.	

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Grade Level: 10-12 Skills/Subject Area: Small Gasoline Engines

COMPETENCY GOAL 3: The learner will identify tools and demonstrate maintenance procedures for all hand tools.

Objectives		Measures
3.1	Match terms associated with tools to the, (including torque wrenches), correct definitions.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7431, 7432, 7433.
3.2	Identify the basic hand tools (including torque wrenches), needed for the maintenance, repair, and overhaul of small engines.	
3.3	Discuss maintenance procedures for tools.	
3.4	Demonstrate the ability to: grind a flat tip screw driver and head of a chisel or punch, sharpen a chisel, and repair damaged thread.	

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Grade Level: 10-12 Skills/Subject Area: Small Gasoline Engines

COMPETENCY GOAL 4: The learner will measure, describe, and identify the micrometer and dial indicator, and state the difference between each instrument.

Objectives	Measures
4.1 Match terms associated with measuring, with the correct definitions.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7431, 7432, 7433.
4.2 Identify measuring instruments used in small engine repairs.	
4.3 List four steps for reading measuring instruments, and name three basic units of measurement found on the rule.	
4.4 Identify and discuss the major parts of a outside micrometer, and check the accuracy of outside micrometers.	
4.5 Arrange steps for set up and use of a dial indicator, and read plain micrometer settings.	
4.6 Demonstrate the ability to use a plain micrometer and dial indicator.	

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Grade Level: 10-12 Skills/Subject Area: Small Gasoline Engines

COMPETENCY GOAL 5: The learner will distinguish between characteristics of a four-cycle and a two-cycle engine and list types of information which may be found on an engine nameplate.

Objectives		Measures
5.1	Match definitions with terms associated with engine identification and inspection.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7431, 7432, 7433.
5.2	Distinguish between a four-stroke cycle engine and two-stroke cycle engine.	
5.3	List three types of information found on the engine nameplate.	
5.4	Identify the operating positions of the crankshaft and complete an engine information form.	

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Grade Level: 10-12 Skills/Subject Area: Small Gasoline Engines

COMPETENCY GOAL 6: The learner will list types and forms of energy; calculate problems dealing with work, horsepower, torque, and cubic inch displacement; distinguish between internal and external combustion engines; and describe the operation of two-stroke and four-stroke cycle engines.

Objectives	Measures
6.1 Match definitions with terms associated with basic engine principles.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7431, 7432, 7433.
6.2 Discuss characteristics of energy and list types of energy, forms of available energy, types of motion, and types and uses of simple machines.	
6.3 Calculate problems for work, horsepower, and torque.	
6.4 Distinguish between types of heat engines and the parts of a basic internal combustion engine.	
6.5 Describe the process by which an internal combustion engine converts chemical energy into rotary motion.	
6.6 Calculate problems for engine cubic inch displacement and for compression ratio.	
6.7 Discuss the purpose of the flywheel.	
6.8 Identify types of engine design and engine cooling.	

Grade Level: 10-12 Skills/Subject Area: Small Gasoline Engines

COMPETENCY GOAL 7: The learner will identify the components of a four-stroke cycle engine, the parts of a camshaft lobe, and the types of valve arrangements.

	Objectives	Measures
7.1	Match terms associated with the principles of operation of a four-stroke cycle engine to the correct definitions.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7431, 7432, 7433.
7.2	Identify the components of a four-stroke cycle engine and discuss its operation.	
7.3	Identify parts of the camshaft lobe, discuss valve timing and overlap, and discuss different types of valve arrangements.	

Grade Level: 10-12 Skills/Subject Area: Small Gasoline Engines

COMPETENCY GOAL 8: The learner will identify the components, and discuss the operation of, a two-stroke cycle engine.

	Objectives	Measures
8.1	Match terms associated with two-stroke cycle engines to the correct definitions and identify the basic engine components.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7431, 7432, 7433.
8.2	Identify the types of valves used in two-stroke cycle engines and discuss two-stroke cycle engine operation.	
8.3	Distinguish between cross scavenged and loop scavenged two-stroke cycle engines.	
8.4	List features which make a two-stroke cycle engine preferable for many applications and discuss the importance of correct exhaust system design on a two-stroke cycle engine.	

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Grade Level: 10-12 Skills/Subject Area: Small Gasoline Engines

COMPETENCY GOAL 9: The learner will be able to discuss types of current and the relationship between electricity and magnetism, identify types of electrical circuits, and demonstrate the ability to solve problems using Ohm's Law.

	Objectives	Measures
9.1	Match terms associated with basic electricity to the correct definitions, identify sources of electricity related to small engine repair, select parts of a basic circuit, and distinguish between good conductors and insulators of electricity.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7431, 7432, 7433.
9.2	Discuss direct and alternating current, explain why copper is widely used as a conductor, match the basic circuit terms to their units of measure, and match the basic electrical schematic symbols to the correct names.	
9.3	Match the letter designations used in Ohm's Law to the correct terms, draw Ohm's Law formula in triangle expression, and state Ohm's Law in letter formula for calculating voltage, current, and resistance.	
9.4	Identify three types of electrical circuits, list three rules for a series circuit, list three rules for a parallel circuit, select factors affecting resistance in a conductor, select the characteristics of magnetism, explain two ways an iron bar may be magnetized, and discuss the relationship between electricity and magnetism.	
9.5	Select the factors that determine the magnitude of the induced voltage, select instruments used in checking electrical circuits, and solve problems using Ohm's Law formula.	

Grade Level: 10-12 Skills/Subject Area: Small Gasoline Engines

COMPETENCY GOAL 10: The learner will identify the components and state the purpose of the ignition system; demonstrate proper testing of the coil, condenser, armature, and flywheel magnets; remove and replace contact points and condenser; test and adjust solid state ignition system, and install and service spark plugs.

	Objectives	Measures
10.1	State the purpose of the ignition system, match the types of ignition systems to the correct descriptions, distinguish between the components of a primary and secondary ignition circuit.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7431, 7432, 7433.
10.2	Identify the components of a magneto ignition system, the components of a solid state ignition system, and the components of a breakerless ignition system.	
10.3	Match the components of the ignition system to the correct purposes and associate the appropriate operational steps with the ignition systems.	
10.4	Demonstrate the ability to remove, service, and replace spark plugs, contact points and condenser, test coil, condenser, armature and flywheel magnets, test and adjust a solid state ignition system, and check ignition timing.	

Grade Level: 10-12 Skills/Subject Area: Small Gasoline Engines

COMPETENCY GOAL 11: The learner will be able to remove and replace, disassemble, check, and reassemble a generator and alternator.

	Objectives	Measures
11.1	Match terms associated with the charging system to the correct definitions. List two kinds of charging systems, and match charging system components to the correct functions.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7431, 7432, 7433.
11.2	Identify the parts of a generator and match operating stages of the charging system to the correct functions. Discuss the current flow in a basic generator, discuss how a generator converts AC to DC, match the external generator regulator to the correct functions, and match the types of generators to the correct uses.	
11.3	Identify the parts of the alternator system, list two advantages of an alternator over a generator, and discuss reverse polarity.	
11.4	Demonstrate the ability to remove and replace a generator. Disassemble, check, and reassemble a generator. Remove and replace an alternator, and disassemble, check, and reassemble an alternator.	

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Grade Level: 10-12 Skills/Subject Area: Small Gasoline Engines

COMPETENCY GOAL 12: The learner will be able to remove, disassemble, check, reassemble, replace, and install a starter in the engine.

Objectives	Measures
12.1 Match terms associated with starting systems to the correct definitions. Identify the types of small gas engine starters, and match components of the mechanical starting system to the correct functions.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7431, 7432, 7433.
12.2 Match components of the DC starting system to the correct functions. Identify the main parts of a DC wound field starter, the main parts of a DC starter/generator, and types of starter drives.	
12.3 Demonstrate the ability to remove, disassemble, test, service, and reassemble a starter. Replace starter rewind spring.	

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Grade Level: 10-12 Skills/Subject Area: Small Gasoline Engines

COMPETENCY GOAL 13: The learner will list functions of engine oils, match oil additives to their function, name oil contaminants, and discuss ways to avoid oil contamination.

	Objectives	Measures
13.1	Match term associated with lubrication systems to the correct definitions. List five purposes of the lubrication system, and list the two main types of lubrication systems.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7431, 7432, 7433.
13.2	List four purposes of the crankcase breather and match the components of the crankcase breather to the correct purposes.	
13.3	List five functions of engine oil, select the characteristics of a good engine oil, discuss oil ratings and classifications, explain the S.A.E. viscosity number, and explain the A.P.I. classification.	
13.4	Name six oil contaminants, match oil additives to their functions, select factual statements about oil, list general rules for selection and use of oils, discuss two cycle oil selection and use, list ways to avoid contamination, and demonstrate the ability to change oil and filter and service crankcase breather.	

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Grade Level: 10-12 Skills/Subject Area: Small Gasoline Engines

COMPETENCY GOAL 14: The learner will be able to list the functions of the cooling system and identify the components of the cooling system. Remove, clean, and replace air cooling parts, and pressure check the cooling system.

Objectives	Measures
14.1 Match the terms associated with cooling systems to the correct definitions, list three functions of the cooling system, and match the components of the cooling system to their functions.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7431, 7432, 7433.
14.2 Demonstrate the ability to remove, clean, and replace air cooling parts.	
14.3 Use equipment to check pressure in the cooling system.	

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Grade Level: 10-12 Skills/Subject Area: Small Gasoline Engines

COMPETENCY GOAL 15: The learner will be able to list the purpose of each of the components of the fuel system, describe the fuel pump action, and service the air filter.

Objectives	Measures
15.1 Match terms associated with the fuel system to the correct definitions, state the purpose of the fuel system, and list the three basic types of small engine fuel supply systems.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7431, 7432, 7433.
15.2 List the purpose of the components of the fuel system, identify three types of fuel filters, describe the fuel pump action during inlet-outlet strokes, and identify three types of air cleaners.	
15.3 Identify parts of the carburetor, and match the carburetor systems to the correct statements of their use.	
15.4 Demonstrate the ability to service air cleaner, remove and replace carburetor, service float type carburetor, remove and replace fuel pump, and service fuel filter.	

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Grade Level: 10-12 Skills/Subject Area: Small Gasoline Engines

COMPETENCY GOAL 16: The learner will list purposes of the governor system, identify the components of the governor system, and demonstrate the ability to adjust and repair a governor system.

Objectives	Measures
16.1 Match terms associated with the governor system to the correct definitions, list three purposes of the governor system, and list three types of governors.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7431, 7432, 7433.
16.2 Identify the components of the governor systems and their purposes.	
16.3 Demonstrate the ability to inspect, adjust, and repair air vane and mechanical governors.	

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Grade Level: 10-12 Skills/Subject Area: Small Gasoline Engines

COMPETENCY GOAL 17: The learner will list purposes of the exhaust system, select types of exhaust systems, and perform maintenance on the exhaust system.

	Objectives	Measures
17.1	Match terms associated with the exhaust system to the correct definitions, list four purposes of the exhaust system, list two results that can occur from running a worn or damaged exhaust system, select types of exhaust systems, and state the danger of operating an engine in a closed shop.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7431, 7432, 7433.
17.2	Demonstrate the ability to remove, service, and replace two-cycle exhaust systems.	

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Grade Level: 10-12 Skills/Subject Area: Small Gasoline Engines

COMPETENCY GOAL 18: The learner will be able to troubleshoot engine problems.

Objectives	Measures
18.1 Define "troubleshooting" and identify requirements for an engine to run.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7431, 7432, 7433.
18.2 List seven basic troubleshooting procedures and discuss the importance of understanding troubleshooting procedures.	
18.3 Demonstrate the ability to troubleshoot an engine problem.	

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Grade Level: 10-12 Skills/Subject Area: Small Gasoline Engines

COMPETENCY GOAL 19: The learner will be able to disassemble and reassemble a four-stroke engine as well as inspect and service the cylinder, piston, rings, connective rod, crankshaft assembly, and valve train.

Objectives	Measures
19.1 Match terms associated with the overhaul of a four-stroke cycle engine to the correct definitions and list five causes of engine problems.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7431, 7432, 7433.
19.2 Identify the parts of the piston and connecting rod assembly, crankshaft assembly, multipiece crankshaft assembly, and the parts of the valve train.	
19.3 Demonstrate the ability to disassemble a four-stroke cycle engine.	
19.4 Demonstrate the ability to inspect and service a cylinder.	
19.5 Demonstrate the ability to inspect and service the piston, rings, and connecting rod.	
19.6 Demonstrate the ability to inspect and service a crankshaft assembly.	
19.7 Demonstrate the ability to service a multipiece crankshaft assembly.	
19.8 Demonstrate the ability to inspect and service a valve assembly.	
19.9 Demonstrate the ability to reassemble a four-stroke cycle engine.	

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Grade Level: 10-12 Skills/Subject Area: Small Gasoline Engines

COMPETENCY GOAL 20: The learner will match terms associated with two-stroke cycle engines to their correct definitions; be able to list causes of engine problems; disassemble, inspect, service, and reassemble a two stroke cycle engine.

Objectives		Measures
20.1	Match terms with two-cycle engine overhaul and list causes of two-cycle engine problems.	Refer to Competency Test Item Bank VEC -T&I-C/TB 7431, 7432, 7433.
20.2	Identify the parts of the two-stroke cycle engine piston and connecting rod assembly, and identify the parts of a two-stroke cycle crankshaft assembly.	
20.3	Demonstrate the ability to disassemble, inspect and service a two-stroke cycle engine, service a multipiece crankshaft, and reassemble a two-stroke cycle engine.	

Grade Level: 10-12 Skills/Subject Area: Small Gasoline Engines

COMPETENCY GOAL 21: The learner will identify characteristics of a good leader.

Objectives	Measures
21.1 Define "leadership."	Refer to Competency Test Item Bank VEC-T&I-C/TB 7431, 7432, 7433.
21.2 Name characteristics of a good leader.	
21.3 Identify selected leaders within the community and list three factors that identify each as a leader.	

Grade Level: 10-12 Skills/Subject Area: Small Gasoline Engines

COMPETENCY GOAL 22: The learner will demonstrate an understanding of parliamentary procedure.

Objectives	Measures
22.1 Describe the importance of, and use of, parliamentary procedure.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7431, 7432, 7433.
22.2 List the items of a business agenda.	

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Grade Level: 10-12 Skills/Subject Area: Small Gasoline Engines

COMPETENCY GOAL 23: The learner will correctly perform seventeen rules of parliamentary procedure.

Objectives	Measures
23.1 Demonstrate the following parliamentary procedure abilities: main motion, amend, previous question, point of order, nominations and elections, and adjourn.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7431, 7432, 7433.
23.2 Demonstrate the following parliamentary procedure abilities: appeal from decision of the chair, lay on the table, take from the table, refer to committee, and parliamentary inquiry.	
23.3 Demonstrate the following parliamentary procedure abilities: suspend standing rules, division of assembly, leave to withdraw a motion, reconsider, rescind, and call for orders of the day.	

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Grade Level: 10-12 Skills/Subject Area: Small Gasoline Engines

COMPETENCY GOAL 24: The learner will participate in a youth club meeting (VICA).

Objectives	Measures
24.1 Preside over a VICA business meeting.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7431, 7432, 7433.
24.2 Preside over a VICA committee meeting.	

Tailoring Outline

1. Orientation

    a. Job opportunities
    b. Job attitudes
    c. Terms

2. Safety

    a. Safety terms
    b. Housekeeping
    c. Tools and equipment

3. Tools and Equipment

    a. Hand tools
    b. Maintenance
    c. Safety

4. Techniques

    a. Hand sewing
    b. Machine sewing
    c. Pressing
    d. Layout and cutting
    e. Alterations
    f. Types of clothing
    g. Fabrics

5. Sewing

    a. Industrial
    b. Personal

6. Leadership Development

    a. Characteristics of a good leader
    b. Parliamentary procedures
    c. VICA participation

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Tailoring

COMPETENCY GOAL 1: The learner will select, use, and maintain tools and equipment safely and efficiently.

Objectives	Measures
1.1 Identify tools of the trade.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7821, 7822, 7823.
1.2 Select appropriate tools for a given task.	
1.3 Recognize and practice safety principles in the use of tools and equipment.	

Grade Level: 10-12 Skills/Subject Area: Tailoring

COMPETENCY GOAL 2: The learner will demonstrate the use of basic hand sewing techniques that are necessary in the needle trades.

Objectives	Measures
2.1 Identify and describe basic hand tools used in sewing.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7821, 7822, 7823.
2.2 Perform selected stitching variations using various hand stitches.	
2.3 Use hand tools safely and efficiently.	

Grade Level: 10-12 Skills/Subject Area: Tailoring

COMPETENCY GOAL 3: The learner will demonstrate the use of basic equipment used for pressing.

Objectives	Measures
3.1 Identify and describe uses of various types of pressing equipment.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7821, 7822, 7823.
3.2 Use pressing equipment safely and efficiently.	
3.3 Describe procedures for pressing special fabrics.	
3.4 Identify pressing characteristics of common fabrics.	
3.5 Press construction details during construction or alteration of garments.	
3.6 Perform the "order to follow" for final pressing.	

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Grade Level: 10-12 Skills/Subject Area: Tailoring

COMPETENCY GOAL 4: The learner will demonstrate the ability to use and maintain various types of sewing machines.

Objectives	Measures
4.1 Identify different types of sewing machines.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7821, 7822, 7823.
4.2 Perform selected stitching variations using the sewing machine.	
4.3 Describe the operation of various parts of sewing machines.	
4.4 Use various sewing machines safely and efficiently.	
4.5 Explain basic sewing maneuvers and describe procedures for handling materials.	
4.6 Name and explain the use of various attachments.	
4.7 Name common sewing problems and their causes.	
4.8 Make adjustments and repairs usually expected of operators.	

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Grade Level: 10-12 Skills/Subject Area: Tailoring

COMPETENCY GOAL 5: The learner will perform the basic skills necessary for drafting, cutting, and fitting skirts.

Objectives	Measures
5.1 Perform basic procedures for drafting simple A-line skirts.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7821, 7822, 7823.
5.2 Perform procedures for pattern layout and cutting.	
5.3 Perform selected stitching variations using the sewing machines.	
5.4 Perform selected stitching variations using hand technique.	
5.5 Use appropriate pressing technique.	
5.6 Fit and make alterations common to skirts.	

Grade Level: 10-12 Skills/Subject Area: Tailoring

COMPETENCY GOAL 6: The learner will perform basic skills necessary for drafting, cutting, and fitting trousers.

Objectives	Measures
6.1 Perform basic procedures for drafting trouser patterns.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7821, 7822, 7823.
6.2 Perform procedures for layout and cutting trousers.	
6.3 Perform selected stitching variations using the sewing machine and hand techniques.	
6.4 Use appropriate pressing techniques.	
6.5 Fit and make alterations common to trousers.	

Grade Level: 10-12 Skills/Subject Area: Tailoring

COMPETENCY GOAL 7: The learner will perform basic skills necessary for drafting, cutting, and fitting vests.

Objectives	Measures
7.1 Perform basic procedures for drafting vest patterns.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7821, 7822, 7823.
7.2 Perform procedures for layout and cutting vests.	
7.3 Perform selected stitching variations using the sewing machine and hand techniques.	
7.4 Use appropriate pressing techniques.	
7.5 Fit and make alterations common to vests.	

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Grade Level: 10-12 Skills/Subject Area: Tailoring

COMPETENCY GOAL 8: The learner will perform basic skills necessary for drafting, cutting, and fitting coats.

Objectives	Measures
8.1 Perform the procedures for drafting coat, sleeve, and collar patterns.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7821, 7822, 7823.
8.2 Perform procedures for layout and cutting coats, sleeves, and collars.	
8.3 Perform selected stitching variations using sewing machines and hand techniques.	
8.4 Use appropriate pressing techniques.	
8.5 Fit and make alterations common to coats.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Tailoring

COMPETENCY GOAL 9: The learner will perform basic skills in altering various types of women's garments.

Objectives	Measures
9.1 Analyze an improperly fitted garment and make appropriate alterations.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7821, 7822, 7823.
9.2 Recognize and perform the steps involved in fitting, marking, and recording information for alterations.	
9.3 Perform alterations to meet acceptable standards.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Tailoring

COMPETENCY GOAL 10: The learner will perform basic skills necessary in alteration of men's garments.

Objectives	Measures
10.1 Analyze an improperly fitting garment and make appropriate alterations.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7821, 7822, 7823.
10.2 Recognize and perform steps involved in fitting, marking, and recording information for alterations.	
10.3 Perform alterations to meet acceptable standards.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Tailoring

COMPETENCY GOAL 11: The learner will recognize characteristics of various fabrics and use appropriate construction and pressing techniques.

Objectives	Measures
11.1 Recognize characteristics of various fibers.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7821, 7822, 7823.
11.2 Use appropriate construction and pressing techniques when working with different fabrics.	
11.3 Use appropriate procedures in the care of various fabrics.	
11.4 Summarize provisions of federal textile laws.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Tailoring

COMPETENCY GOAL 12: The learner will use appropriate judgement in the selection and alteration of patterns and fabric in order to achieve a custom-made look.

Objectives	Measures
12.1 Take accurate body measurements.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7821, 7822, 7823.
12.2 Identify factors which should be considered in pattern selection.	
12.3 Plan pattern alterations for specific situations.	
12.4 Devise ways to incorporate growth features into children's clothes.	

Grade Level: 10-12 Skills/Subject Area: Tailoring

COMPETENCY GOAL 13: The learner will use appropriate methods of clothing construction.

Objectives	Measures
13.1 Recognize construction techniques used to shape garments.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7821, 7822, 7823.
13.2 Use construction techniques used for various seams, darts, pleats, and gathers according to established standards.	
13.3 Use appropriate techniques for applying various closures and fasteners.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Tailoring

COMPETENCY GOAL 14: The learner will recognize the sewing machine operators' role in industrial garment production.

Objectives	Measures
14.1 Describe the basic methods for transferring work from one operator to another.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7821, 7822, 7823.
14.2 Explain and describe major operations in making apparel.	
14.3 Identify terminology used in the apparel industry.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Tailoring

COMPETENCY GOAL 15: The learner will apply appropriate business procedures for operating an alteration or custom-sewing business.

Objectives	Measures
15.1 Recognize the advantage of owning your own business.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7821, 7822, 7823.
15.2 Display knowledge and awareness of licensing and income tax laws.	
15.3 Define "over" and "statement."	
15.4 Record correct and thorough information about customers.	
15.5 Establish and arrange a safe and efficient shop.	
15.6 Select appropriate facilities that are needed in a tailor shop.	
15.7 Demonstrate how management techniques can affect customer relations.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Tailoring

COMPETENCY GOAL 16: The learner will identify and demonstrate the qualities and characteristics necessary for good leadership.

Objectives	Measures
16.1 Preside over VICA club meetings.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7821, 7822, 7823.
16.2 Conduct VICA committee meetings.	
16.3 Demonstrate an understanding of parliamentary procedure.	
16.4 Participate in civic activities.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Tailoring

COMPETENCY GOAL 17: The learner will identify characteristics of a good leader.

Objectives	Measures
17.1 Define "leadership."	Refer to Competency Test Item Bank VEC-T&I-C/TB 7821, 7822, 7823.
17.2 Name characteristics of a good leader.	
17.3 Identify selected leaders within the community and list three factors that identify each as a leader.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Tailoring

COMPETENCY GOAL 18: The learner will demonstrate an understanding of parliamentary procedure.

Objectives	Measures
18.1 Describe the importance of, and use of, parliamentary procedure.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7821, 7822, 7823.
18.2 List the items of a business agenda.	

Grade Level: 10-12 Skills/Subject Area: Tailoring

COMPETENCY GOAL 19: The learner will perform correctly seventeen parliamentary procedure abilities.

Objectives	Measures
19.1 Demonstrate the following parliamentary procedure abilities: main motion, amend, previous question, point of order, nominations, elections, and adjournment.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7821, 7822, 7823.
19.2 Demonstrate the following parliamentary procedure abilities: appeal from decision of the chair, lay on the table, take from the table, refer to committee, and parliamentary inquiry.	
19.3 Demonstrate the following parliamentary procedure abilities: suspend standing rules, division of assembly, leave to withdraw a motion, reconsider, rescind, and call for orders of the day.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Tailoring

COMPETENCY GOAL 20: The learner will participate in a youth club meeting (VICA).

Objectives	Measures
20.1 Preside over a VICA business meeting.	Refer to Competency Test Item Bank VEC-T&I-C/TB
20.2 Preside over a VICA committee meeting.	7821, 7822, 7823.

Technical Drafting Outline

1. Communication

    a. Architectural terms
    b. Architectural synonyms

2. Equipment

    a. Use of drafting equipment
    b. Identification of equipment and supplies

3. Working Drawing, Sectional and Auxiliary Views, and Pictorial Drawings

    a. Work drawings
    b. Section, auxiliary, and pictorial views

4. Design procedures

    a. Proper drafting techniques
    b. Architectural drawings
    c. Architectural schedules
    d. Architectural models
    e. Cost analysis
    f. Machine design drawings

5. Concepts

    a. Technical and mathematical computations
    b. Basic architectural concepts
    c. Basic machine design concepts

6. Leadership

    a. Characteristics of a good leader
    b. Importance of parliamentary procedure
    c. Correct use of 17 parliamentary procedures
    d. VICA participation

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Technical Drafting

COMPETENCY GOAL 1: The learner will develop drafting communication skills.

Objectives	Measures
1.1 Develop a simple glossary of machine design terms.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
1.2 Interpret machine drafting standards.	
1.3 Identify machine design symbols.	
1.4 Write reports using appropriate machine design technology, symbols and grammar.	
1.5 Develop a simple glossary of architectural terms.	
1.6 Interpret standard architectural abbreviations.	
1.7 Interpret architectural synonyms.	
1.8 Identify architectural symbols.	
1.9 Write technical reports using appropriate architectural technology, symbols, and grammar.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Technical Drafting

COMPETENCY GOAL 2: The learner will use drafting equipment.

Objectives	Measures
2.1 Use a drafting table.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
2.2 Use drafting instruments.	
2.3 Operate the blueprint machine.	
2.4 Use architectural templets.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Technical Drafting

COMPETENCY GOAL 3: The learner will identify drafting equipment and supplies.

Objectives	Measures
3.1 Identify drafting equipment.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
3.2 Select drawing materials and equipment for specific projects.	
3.3 Identify the qualities of good tracing paper.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Technical Drafting

COMPETENCY GOAL 4: The learner will construct working drawings of auxiliary and pictorial views.

Objectives	Measures
4.1 Interpret orthographic projections.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
4.2 Draw orthographic projections.	
4.3 Layout the views for a working drawing.	
4.4 Explain the purpose of an assembly drawing.	
4.5 Identify and draw threads.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Technical Drafting

COMPETENCY GOAL 5: The learner will draw sectional, auxiliary, and pictorial views.

Objectives	Measures
5.1 Draw four types of sectional views.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
5.2 Describe the advantages of a sectional drawing.	
5.3 Draw an auxiliary view.	
5.4 Draw a pictorial circle.	
5.5 Convert an orthographic angle to a pictorial angle.	
5.6 Draw three types of pictorial drawings.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Technical Drafting

COMPETENCY GOAL 6: The learner will use proper drafting techniques.

Objectives	Measures
6.1 Demonstrate standard block and free hand methods of lettering.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
6.2 Identify line types and weights.	
6.3 Interpret functional drafting rules.	
6.4 Use proper techniques of geometric construction.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Technical Drafting

COMPETENCY GOAL 7: The learner will make architectural drawings.

Objectives	Measures
7.1 Draw floor plans.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
7.2 Dimension floor plans.	
7.3 Draw a foundation plan.	
7.4 Draw a typical wall section.	
7.5 Draw roof types.	
7.6 Plan a residential lighting system layout.	
7.7 Draw a plumbing diagram.	
7.8 Plan a residential heating and air conditioning system layout.	
7.9 Draw elevation views.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Technical Drafting

COMPETENCY GOAL 8: The learner will make architectural schedules.

Objectives	Measures
8.1 Prepare door schedules.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
8.2 Prepare window schedules.	
8.3 Prepare finish schedules.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Technical Drafting

COMPETENCY GOAL 9: The learner will use architectural models.

Objectives	Measures
9.1 Make an architectural model.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Technical Drafting

COMPETENCY GOAL 10: The learner will perform cost analysis.

Objectives	Measures
10.1 Make a cost analysis of a construction project.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
10.2 Describe the principles of construction cost analysis.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Technical Drafting

COMPETENCY GOAL 11: The learner will make machine design drawings.

Objectives	Measures
11.1 Demonstrate basic principles of machine drafting.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
11.2 Draw a basic machine shop layout.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Technical Drafting

COMPETENCY GOAL 12: The learner will make technical, and mathematical computations.

Objectives	Measures
12.1 Complete decimal fraction calculations.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
12.2 Complete geometrical calculations.	
12.3 Use metric measurements.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Technical Drafting

COMPETENCY GOAL 13: The learner will describe basic architectural concepts.

Objectives	Measures
13.1 Recognize careers related to architecture.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
13.2 Describe the theory of design.	
13.3 Identify a variety of building materials.	
13.4 Describe principles of area planning.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Technical Drafting

COMPETENCY GOAL 14: The learner will describe basic machine design concepts.

Objectives	Measures
14.1 Recognize careers related to machine drafting.	Refer to competency Test Item Bank VEC-T&I-C/TB 7551, 7552, 7553.
14.2 Describe characteristics of different metals.	
14.3 Describe basic shop processes.	

Textiles Outline

1. Terminology, Organization, and Technical Information

   a. Textile stock
   b. Textile dyes and chemicals
   c. Quality control testing equipment reports
   d. Training manuals
   e. Plant manufacturing layout
   f. Plain weave pattern, twill weave pattern, and satin weave pattern
   g. Jersey knit structure, rib knit structure, and purl knit structure
   h. Yarn and fabric manufacturing terms and dyeing and finishing terms
   i. Textile products in apparel, home furnishings, and industrial markets
   j. Work orders and requisitions
   k. Career opportunities

2. Tools, Equipment, and Supplies

   a. Yarn reel and scales
   b. Pick glass
   c. Reed hook and weaver's scissors
   d. Time study
   e. Lab dyeing kits
   f. Yarn fabric and dyeing supplies

3. Manufacturing Processes and Operation

   a. Tending and operative carding machine
   b. Tending and operative spinning machine
   c. Jobs pertaining to yarn preparation
   d. Tending and operative weaving machine
   e. Tending and operative knitting machine
   f. Maintenance and repair of textile machinery
   g. Analyzing woven, knitted, and tufted swatches of fabric
   h. Physically testing textile yarns
   i. Chemically testing textile yarns
   j. Physically testing textile fabrics
   k. Chemically testing textile fabrics
   l. Jobs that depend on textile industry
   m. Converting fiber to fabric
   n. Textile calculations
   o. Quality control standards
   p. Defects in textile stock
   q. Safety rules
   r. Accident classification
   s. Plant organization chart

4. Program Structure, Attitudes, and Employer/Employee Relations

   a. Course content outline
   b. Awareness of positive attitudes
   c. Identification of employer/employee relations

5. Leadership

   a. Characteristics of a good leader
   b. Importance of parliamentary procedure
   c. Correct use of 17 parliamentary procedures
   d. VICA participation

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 1: The learner will identify types of textile stock.

Objectives	Measures
1.1 List principal natural fibers.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
1.2 List principal man-made fibers.	
1.3 Identify the origins of the principal fibers.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 2: The learner will identify types of textile dyes and chemicals.

Objectives	Measures
2.1 List the major dyes and the fiber groups with which they are used.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
2.2 Distinguish the difference between dyeing methods.	
2.3 Identify the different finishing methods.	

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 3: The learner will interpret quality control testing equipment reports.

Objectives	Measures
3.1 Demonstrate method of testing yarn strength.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
3.2 Explain the proper use of a hygrometer.	
3.3 Explain the proper use of ultraviolet light test equipment.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 4: The learner will develop training manuals.

Objectives	Measures
4.1 Compile an individual training manual.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
4.2 Collect materials for training manual from professional organizations.	

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 5: The learner will diagram a complete plant manufacturing layout.

Objectives	Measures
5.1 Develop a manufacturing flowchart.	Refer to competency Test Item Bank VEC-T&I-C/TB
5.2 Develop a staffing flowchart.	7831, 7832, 7833.

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 6: The learner will design a plain weave pattern, a twill weave pattern, and a satin weave pattern.

Objectives	Measures
6.1 Identify plain, twill, and basket weaves, using a pick glass.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
6.2 List five different types of weaves.	
6.3 Distinguish among the different properties of plain, twill, and basket weaves.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12　　Skills/Subject Area: Textiles

COMPETENCY GOAL 7: The learner will design a jersey knit structure, a rib knit structure, a purl knit structure, and an interlock knit structure.

Objectives	Measures
7.1 Compare the difference between warp and weft knitting.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
7.2 Describe the properties of weft knit fabric.	

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 8: The learner will develop a glossary of yarn manufacturing terms, fabric manufacturing terms, and dyeing and finishing terms.

Objectives	Measures
8.1 List the terms associated with the processing of cotton fabric.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
8.2 List the terms associated with the processing of man-made fabric.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 9: The learner will list textile products in the apparel markets, in the home furnishings markets, and in the industrial markets.

Objectives	Measures
9.1 List ten textile products used in most homes.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
9.2 List five textile products used frequently in industrial applications.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 10: The learner will interpret work orders and requisitions.

Objectives	Measures
10.1 Interpret a weave pattern (design).	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
10.2 Interpret a knit pattern (design).	
10.3 Interpret a nonconventional pattern (design).	
10.4 Complete a requisition for parts from the supply room.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 11: The learner will describe career opportunities in textiles as they relate to educational levels.

Objectives	Measures
11.1 Describe difference between a production type job and a service type job.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
11.2 Describe the difference between an hourly paid job and an incentive job.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 12: The learner will use yarn reel and scales.

Objectives	Measures
12.1 Contrast measurements for length and for weights between the English and metric systems.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
12.2 Demonstrate proper use of yarn reel.	
12.3 Demonstrate proper use of yarn scales.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 13: The learner will use pick glass.

Objectives	Measures
13.1 Compare various types of pick glasses.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
13.2 Compare sizes of pick glasses.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 14: The learner will use reel hook and weaver's scissors.

Objectives	Measures
14.1 Demonstrate proper use of reel hook.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
14.2 Demonstrate proper use of weaver's scissors.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 15: The learner will conduct a time study using a stopwatch.

Objectives	Measures
15.1 Conduct loom stop studies.	Refer to competency Test Item Bank VEC-T&I-C/TB
15.2 Conduct ends down checks.	7831, 7832, 7833.

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 16: The learner will use lab dyeing kits.

Objectives	Measures
16.1 List the three common methods of dyeing fabrics.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
16.2 Briefly explain each of the dyeing methods selected in 16.1.	

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 17: The learner will list yarn manufacturing supplies, fabric manufacturing supplies, and dyeing and finishing supplies.

Objectives	Measures
17.1 Describe the difference between expendable and nonexpendable supplies.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
17.2 Follow instructions in completing a supply requisition.	

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 18: The learner will demonstrate skills in tending an operative carding machine.

Objectives	Measures
18.1 List the skills necessary to properly operate a carding machine.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
18.2 Demonstrate the proper skills in operating and tending a carding machine.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 19: The learner will demonstrate skills in tending an operative spinning machine.

Objectives	Measures
19.1 List the skills necessary to properly operate a spinning machine.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
19.2 Demonstrate the proper skills in operating a spinning machine.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 20: The learner will demonstrate skills in selected jobs pertaining to yarn preparation.

Objectives	Measures
20.1 List the skills necessary to properly prepare yarn.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
20.2 List the job titles of persons involved in the preparation of yarn.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 21: The learner will demonstrate skills in tending an operative weaving machine.

Objectives	Measures
21.1 Demonstrate skills in tending an operative unifil.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
21.2 Demonstrate skill in tending magazines.	
21.3 Demonstrate skill in tending operative battery.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 22: The learner will demonstrate skills in tending an operative knitting machine.

Objectives	Measures
22.1 Demonstrate skills in hosiery sewing.	Refer to competency Test Item Skills VEC-T&I-C/TB 7831, 7832, 7833.
22.2 Demonstrate skills in selected jobs pertaining to a hosiery operation.	
22.3 Demonstrate skills in selected jobs pertaining to a single/double knit operation.	
22.4 Demonstrate skills in selected job pertaining to a warp knit operation.	
22.5 Develop a flowchart for the processes involved in a knitting operation.	

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 23: The learner will demonstrate skills in maintenance and repair of textile machinery.

Objectives	Measures
23.1 Make a list of different types of textile machinery.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
23.2 List the most common causes of knitting machine failures.	
23.3 List the maintenance items necessary to properly maintain a knitting machine.	

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 24: The learner will analyze a woven swatch of fabric, a knitted swatch of fabric, and a tufted swatch of fabric.

Objectives	Measures
24.1 Make a list of different methods of producing a fabric.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
24.2 Identify a swatch of three different types of fabric.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 25: The learner will demonstrate skills in physically testing textile yarns.

Objectives	Measures
25.1 List the different methods for testing textile yarns.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
25.2 Identify a fabric that has the feel of wool.	
25.3 Identify a fabric that has the odor of burning paper in a burning test.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 26: The learner will demonstrate skills in chemically testing textile yarns.

Objectives	Measures
26.1 List the commonly used chemicals in testing yarns.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
26.2 Demonstrate the safe procedure for testing natural and man-made fibers.	

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 27: The learner will demonstrate skills in physically testing textile fabrics.

Objectives	Measures
27.1 Perform burn tests on selected natural fabric samples.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
27.2 Perform burn tests on selected man-made fabric samples.	

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 28: The learner will demonstrate skills in chemically testing textile fabrics.

Objectives	Measures
28.1 List the commonly used chemicals in testing fabrics.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
28.2 Demonstrate the safe procedure for testing natural and man-made fibers in fabrics.	

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 29: The learner will list related jobs that depend upon the textile industry.

Objectives	Measures
29.1 List five related textile jobs in the home furnishing area.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
29.2 List five related textile jobs in the industrial and/or business area.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 30: The learner will describe the process involved in converting fiber to fabric.

Objectives	Measures
30.1 List the three methods of making cloth.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
30.2 Briefly describe one of the methods in 30.1.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 31: The learner will perform basic textile calculations.

Objectives	Measures
31.1 Demonstrate the proper use of a pick glass.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
31.2 Explain how the pick glass is used to determine the count of yarn.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 32: The learner will use established quality control standards.

Objectives	Measures
32.1 Use shading board.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
32.2 Analyze a specification sheet.	
32.3 Identify standard conditions in a laboratory.	
32.4 Demonstrate the use of balances.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 33: The learner will identify defects in textile stock.

Objectives	Measures
33.1 Identify the methods in determining average staple length.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
33.2 List at least three defects in textile stock and give their probable causes.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 34: The learner will interpret plant safety rules.

Objectives	Measures
34.1 List ten safety rules to follow when working in the weave room.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
34.2 Demonstrate proper safety rules when operating a loom.	

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 35: The learner will classify accidents as first aid, medical, or lost time.

Objectives	Measures
35.1 Actively participate in a certified first aid program.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
35.2 Classify accidents as first aid, medical, or lost time.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 36: The learner will describe a Plant Organization Chart.

Objectives	Measures
36.1 Explain the phrase, plant organizational chart.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
36.2 Locate your department on organizational chart, and name your immediate supervisor.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 37: The learner will outline the course content.

Objectives	Measures
37.1 Outline the Textiles I program.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
37.2 Outline the Textiles II program.	
37.3 Outline the Textiles III program.	

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 38: The learner will demonstrate positive attitudes.

Objectives	Measures
38.1 Demonstrate positive self-image.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
38.2 Demonstrate acceptable work behavior.	
38.3 Demonstrate the positive aspects of company loyalty.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Textiles

COMPETENCY GOAL 39: The learner will identify areas which apply to the employer/employee relationship.

Objectives	Measures
39.1 List three ways to improve the employer/employee relationship.	Refer to competency Test Item Bank VEC-T&I-C/TB 7831, 7832, 7833.
39.2 Discuss the employee handbook with immediate supervisor.	

Upholstery Outline

1. Orientation

    a. Job opportunities
    b. Upholstery terms
    c. Job attitudes

2. Safety

    a. Safety terms
    b. Housekeeping
    c. Tools and equipment

3. Mathematics

    a. Measuring
    b. Material estimation

4. Furniture Styles

    a. Characteristics
    b. Outside influences

5. Materials

    a. Components
    b. Structural techniques
    c. Adhesive qualities
    d. Types

6. Tools and Equipment

    a. Hand tools
    b. Sewing machines
    c. Steam machines
    d. Staple guns
    e. Safety

7. Processes

    a. Stripping
    b. Frames
    c. Refinishing
    d. Webbing
    e. Springs
    f. Padding
    g. Covers
    h. Tufts

8. Leadership Development

   a. Characteristics of a good leader
   b. Parliamentary procedure
   c. VICA participation

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Upholstery

COMPETENCY GOAL 1: The learner will list potential career occupations related to furniture upholstering and repair.

Objectives	Measures
1.1 Describe the duties of a furniture upholsterer/repairer.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7521, 7522, 7523.
1.2 List types of employment available to the furniture upholsterer/repairer.	
1.3 Discuss the training necessary for a furniture upholsterer/repairer.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Upholstery

COMPETENCY GOAL 2: The learner will identify employment possibilities, earnings, and probable working conditions.

Objectives	Measures
2.1 List five places of employment.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7521, 7522, 7523.
2.2 Discuss potential earnings.	
2.3 Discuss working conditions found in upholstery shops.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Upholstery

COMPETENCY GOAL 3: The learner will discuss personal safety.

Objectives	Measures
3.1 Discuss proper clothing.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7521, 7522, 7523.
3.2 Discuss safety goggles, masks, etc.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Upholstery

COMPETENCY GOAL 4: The learner will explain tool safety.

Objectives	Measures
4.1 Discuss hand tool safety in the furniture repair shop.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7521, 7522, 7523.
4.2 Discuss power tool safety in the furniture repair shop.	
4.3 Describe tool and material techniques and precautions.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Upholstery

COMPETENCY GOAL 5: The learner will discuss finish room safety.

Objectives	Measures
5.1 Discuss proper storage of materials.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7521, 7522, 7523.
5.2 Discuss use of masks.	
5.3 Describe proper ventilation.	

Grade Level: 10-12 Skills/Subject Area: Upholstery

COMPETENCY GOAL 6: The learner will demonstrate the use of a measuring tape and straight edge rule.

Objectives	Measures
6.1 Use a measuring tape to determine material needs.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7521, 7522, 7523.
6.2 Use a straight edge ruler to determine proper dimensions.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Upholstery

COMPETENCY GOAL 7: The learner will use a tape or rule to judge yardage.

Objectives	Measures
7.1 Estimate yardage of fabric needed for various chairs, sofas, and cushions.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7521, 7522, 7523.
7.2 Calculate price of given yardage of fabric.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Upholstery

COMPETENCY GOAL 8: The learner will discuss reasons individuals select different styles of furniture.

Objectives	Measures
8.1 Discuss how lifestyles affect furniture choices.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7521, 7522, 7523.
8.2 Discuss family size and furniture needs.	

Grade Level: 10-12 Skills/Subject Area: Upholstery

COMPETENCY GOAL 9: The learner will identify three broad categories of furniture styles.

Objectives	Measures
9.1 Describe each style of furniture and state common characteristics of each.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7521, 7522, 7523.
9.2 Describe the foreign influence on American styles of furniture.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Upholstery

COMPETENCY GOAL 10: The learner will identify upholstering materials.

Objectives	Measures
10.1 List frame components.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7521, 7522, 7523.
10.2 Identify metal braces, attaching plates, and hanger bolts.	
10.3 List adhesives and state the use of each.	
10.4 Identify and describe types of webbing.	
10.5 Identify and describe the use of burlap in upholstering.	
10.6 Recognize muslin and explain its use.	
10.7 Identify and tell the use of denim and cambric.	
10.8 Identify and describe the use of upholstery fasteners.	
10.9 List five types of springs used in upholstery and compare their uses.	
10.10 List eight kinds of padding and describe the qualities of each.	
10.11 Identify four types of twine and thread used in upholstery and tell how each is used.	
10.12 Demonstrate the use of roll edging.	

Grade Level: 10-12

Skills/Subject Area: Upholstery

COMPETENCY GOAL 10: The learner will identify upholstering materials.

Objectives	Measures
10.13 Demonstrate blind tacking with blind tack strips.	
10.14 Fabricate a decorative seam using welt cord.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Upholstery

COMPETENCY GOAL 11: The learner will identify and use the basic upholstery hand tools and equipment.

Objectives	Measures
11.1 Identify and describe the proper uses of hand tools used in upholstery.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7521, 7522, 7523.
11.2 Construct a covered button.	
11.3 Cover a cushion with the cushion filler machine.	
11.4 Demonstrate stitching straight and curved lines on the industrial sewing machine.	
11.5 Steam a cushion and chair with the steamer.	
11.6 Demonstrate proper use of air tacker and electric staple gun.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Upholstery

COMPETENCY GOAL 12: The learner will judge upholstery fabric suitability according to style, use, and wearability.

Objectives		Measures
12.1	Compare natural and synthetic fibers by cost, strength, abrasion, resistance, and feel.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7521, 7522, 7523.
12.2	List and construct four different weaves.	
12.3	Define "knit."	
12.4	Describe leather and plastic materials used in upholstery.	
12.5	Summarize cleaning and care of upholstery fabrics.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Upholstery

COMPETENCY GOAL 13: The learner will strip a frame.

Objectives	Measures
13.1 List proper tools for stripping.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7521, 7522, 7523.
13.2 List stripping order.	
13.3 Describe proper use of trestles in stripping.	
13.4 Demonstrate removal of covering.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Upholstery

COMPETENCY GOAL 14: The learner will repair a frame.

Objectives		Measures
14.1	List points to cover when inspecting a frame.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7521, 7522, 7523.
14.2	Describe the method for repairing a loosened joint.	
14.3	Strengthen a joint by adding a corner block.	
14.4	Tell how to repair a tack rail.	

Grade Level: 10-12 Skills/Subject Area: Upholstery

COMPETENCY GOAL 15: The learner will finish and refinish exposed parts of the upholstered frame.

Objectives		Measures
15.1	Compare removers.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7521, 7522, 7523.
15.2	Apply a remover to finished wood.	
15.3	List safety precautions to take when using finishing and refinishing products.	
15.4	Prepare a wood surface for finishing.	
15.5	List types and grades of sandpaper and tell uses of each.	
15.6	List finishes and sealers.	
15.7	Apply finish to wood.	
15.8	Write methods of repairing defects on finished surfaces.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Upholstery

COMPETENCY GOAL 16: The learner will install webbing.

Objectives	Measures
16.1 State the purpose of webbing.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7521, 7522, 7523.
16.2 Draw proper placement of webbing in arms, back, and seats of chairs.	
16.3 Web a chair.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Gr~~ade L~~evel: 10-12 Skills/Subject Area: Upholstery

COMPETENCY GOAL 17: The learner will install springs.

Objectives	Measures
17.1 Compare types of spring construction and identify use of each.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7521, 7522, 7523.
17.2 Demonstrate the proper placement of sinuous springs and coil springs.	
17.3 Install sinuous springs.	
17.4 Align sinuous springs and connect with helical springs.	
17.5 Attach coil springs to webbing using slip knots and twist knots.	
17.6 Demonstrate clove spring knot, overhand knot, and simple loop.	
17.7 Demonstrate four-way tie of coil springs for a flat seat.	
17.8 Demonstrate four-way tie of coil springs for a round seat.	
17.9 Apply edge wire to spring with edge clips.	
17.10 Discuss methods of applying Marshall units.	
17.11 Attach burlap over springs.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Upholstery

COMPETENCY GOAL 18: The learner will install padding.

Objectives	Measures
18.1 List five materials used for padding in furniture.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7521, 7522, 7523.
18.2 Install edge roll on a wood surface and on burlap.	
18.3 Miter a corner with edge roll.	
18.4 Properly stitch padding to burlap.	
18.5 Attach rubberized hair to the seat of a chair.	
18.6 Attach cotton padding to the seat of a chair.	
18.7 Chart oversize allowances for foam padding.	
18.8 Describe the proper method of cutting foam rubber.	
18.9 List the steps in padding a wood platform for a slip seat.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Upholstery

COMPETENCY GOAL 19: The learner will install final coverings.

Objectives	Measures
19.1 List two methods of estimating material needed for the final cover.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7521, 7522, 7523.
19.2 Demonstrate welt fabrication.	
19.3 Demonstrate blind stitching.	
19.4 Sew plain and welt seams.	
19.5 Demonstrate blind tacking.	
19.6 List the steps in making a pleated square corner.	
19.7 List the steps in making a pleated round corner.	
19.8 Discuss and demonstrate fitting fabric around posts.	
19.9 List the order in which new covers are usually installed.	
19.10 Install welt strip.	
19.11 Install a seat cover.	

Grade Level: 10-12

Skills/Subject Area: Upholstery

COMPETENCY GOAL 19: The learner will install final coverings.

Objectives	Measures
19.12 Cover inside arms.	
19.13 Install inside back cover.	
19.14 Mark and install buttons with a slip knot.	
19.15 Install outside arm covers.	
19.16 Install boxings.	
19.17 Construct a kick pleat skirt.	
19.18 Construct a box pleat skirt.	
19.19 Demonstrate blind tacking a skirt to the frame of a chair.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Upholstery

COMPETENCY GOAL 20: The learner will construct channels.

Objectives	Measures
20.1 Construct straight channels.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7521, 7522, 7523.
20.2 Assemble straight channels.	
20.3 Stuff straight channels.	
20.4 Install straight channels.	
20.5 Explain procedure for measuring and laying out tapered channels.	

Grade Level: 10-12 Skills/Subject Area: Upholstery

COMPETENCY GOAL 21: The learner will tuft.

Objectives	Measures
21.1 Describe tufts.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7521, 7522, 7523.
21.2 Layout and mark diamond tufts.	
21.3 List tufting methods.	
21.4 Tack and stuff diamond tufts.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Upholstery

COMPETENCY GOAL 22: The learner will develop a glossary of terms and definitions used in the upholstery industry.

Objectives	Measures
22.1 Demonstrate knowledge of trade language.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7521, 7522, 7523.
22.2 Develop a glossary of upholstery terms.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Upholstery

COMPETENCY GOAL 23: The learner will identify characteristics of a good leader.

	Objectives	Measures
23.1	Define "leadership."	Refer to Competency Test Item Bank VEC-T&I-C/TB 7521, 7522, 7523.
23.2	Name characteristics of a good leader.	
23.3	Identify selected leaders within the community and list three factors that identify each as a leader.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Upholstery

COMPETENCY GOAL 24: The learner will demonstrate an understanding of parliamentary procedure.

Objectives	Measures
24.1 Describe the importance of, and use of, parliamentary procedure.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7521, 7522, 7523.
24.2 List the items of a business agenda.	

Grade Level: 10-12 Skills/Subject Area: Upholstery

COMPETENCY GOAL 25: The learner will correctly perform seventeen parliamentary procedure abilities.

Objectives	Measures
25.1 Demonstrate the following parliamentary procedure abilities: main motion, amend, previous question, point of order, nominations and elections, and adjourn.	Refer to Competency Test Item Bank VEC-T&I-C/TB 7521, 7522, 7523.
25.2 Demonstrate the following parliamentary procedure abilities: appeal from decision of the chair, lay on the table, take from the table, refer to committee, and parliamentary inquiry.	
25.3 Demonstrate the following parliamentary procedure abilities: suspend standing rules, division of assembly, leave to withdraw a motion, reconsider, rescind, and call for orders of the day.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Upholstery

COMPETENCY GOAL 26: The learner will participate in a youth club meeting (VICA).

Objectives	Measures
26.1 Preside over a VICA business meeting.	Refer to Competency Test Item Bank VEC-T&I-C/TB
26.2 Preside over a VICA committee meeting.	7521, 7522, 7523.

Welding Outline

1. Glossary

    a. Welding vocabulary
    b. Welding definitions

2. Safety

    a. Safety precautions
    b. Safe equipment handling

3. Oxyacetylene Processes

    a. Oxyacetylene torch
    b. Oxyacetylene welding
    c. Braze welding

4. Metal Arc Welding

    a. Principles
    b. Procedures

5. Weld Testing

    a. Prepare coupons
    b. Test coupons

6. Gas Tungsten Arc Welding

    a. Principles
    b. Functions

7. Gas Metal Arc Welding

    a. Principles
    b. Functions

8. Pipe Welding

    a. Prepare pipe workpiece
    b. Tack pipe workpiece

9. Leadership

    a. Characteristics of a good leader
    b. Importance of parliamentary procedure
    c. Correct use of 17 parliamentary procedures
    d. VICA participation

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Welding

COMPETENCY GOAL 1: The learner will identify welding terms.

Objectives	Measures
1.1 Identify the general definition of terms used in welding.	Refer to competency Test Item Bank VEC-T&I-C/TB 7871, 7872, 7873.

Grade Level: 10-12　　Skills/Subject Area: Welding

COMPETENCY GOAL 2: The learner will recognize proper safety procedures.

Objectives	Measures
2.1 Identify safe equipment handling procedures.	Refer to competency Test Item Bank VEC-T&I-C/TB 7871, 7872, 7873.
2.2 Demonstrate the safe and proper use of handling equipment.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Welding

COMPETENCY GOAL 3: The learner will use oxyacetylene torch.

Objectives	Measures
3.1 Identify the parts, and explain the functions of, the oxyacetylene torch.	Refer to competency Test Item Bank VEC-T&I-C/TB 7871, 7872, 7873.
3.2 Turn on and shut down the oxyacetylene torch.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Welding

COMPETENCY GOAL 4: The learner will demonstrate the process of oxyacetylene welding.

Objectives	Measures
4.1 Turn on and shut down the cutting torch.	Refer to competency Test Item Bank VEC-T&I-C/TB 7871, 7872, 7873.
4.2 Make a cut on mild steel.	
4.3 Turn on and shut down the welding torch.	
4.4 Weld beads on plate without filler rod.	
4.5 Weld beads on plate with filler rod.	
4.6 Weld joints in different positions with filler rod.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Welding

COMPETENCY GOAL 5: The learner will demonstrate the process of braze welding.

Objectives	Measures
5.1 Identify the principles of brazing.	Refer to competency Test Item Bank VEC-T&I-C/TB 7871, 7872, 7873.
5.2 Braze weld a square edge joint in any position.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Welding

COMPETENCY GOAL 6: The learner will describe the principles of arc welding.

Objectives	Measures
6.1 Identify and describe the parts and functions of the electric arc welding unit.	Refer to competency Test Item Bank VEC-T&I-C/TB 7871, 7872, 7873.
6.2 Identify and select electrodes properly.	
6.3 Setup, adjust, and shut down the arc welding unit.	
6.4 Strike and maintain an arc.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Welding

COMPETENCY GOAL 7: The learner will demonstrate welding procedures.

Objectives	Measures
7.1 Make a pad in the flat position.	Refer to competency Test Item Bank VEC-T&I-C/TB 7871, 7872, 7873.
7.2 Make a pad in the horizontal position.	
7.3 Make a multiple pass T-joint fillet weld in the horizontal position.	
7.4 Make a pad in the overhead position.	
7.5 Make a lap-joint fillet weld in the overhead position.	
7.6 Make a pad in the vertical up position.	
7.7 Make a T-joint fillet weld in the vertical up position.	
7.8 Make a single V-groove butt weld.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Welding

COMPETENCY GOAL 8: The learner will lay out, cut, and prepare coupons.

Objectives	Measures
8.1 Construct a test plate.	Refer to competency Test Item Bank VEC-T&I-C/TB 7871, 7872, 7873.
8.2 Cut and prepare coupons from a test plate.	
8.3 Test prepared coupons.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Welding

COMPETENCY GOAL 9: The learner will describe the principles of gas tungsten arc welding.

Objectives	Measures
9.1 Identify and describe the function of the different parts of the G. T. A. W. process.	Refer to competency Test Item Bank VEC-T&I-C/TB 7871, 7872, 7873.
9.2 Set up and shut down the G. T. A. W. process for welding mild and stainless steel.	
9.3 Set up and shut down the G. T. A. W. process for welding aluminum.	
9.4 Prepare aluminum, stainless steel and mild steel before welding.	
9.5 Make beads with filler rod on steel plate (14-gauge.)	
9.6 Make a flat butt weld using 14-gauge steel.	
9.7 Make a fillet weld in the flat position using 14-gauge steel.	
9.8 Make a butt weld in vertical up position using 14-gauge steel.	
9.9 Make a fillet weld in vertical up position using 14-gauge steel.	
9.10 Make beads with filler rod on 14-gauge aluminum.	

Grade Level: 10-12

Skills/Subject Area: Welding

COMPETENCY GOAL 9: The learner will describe the principles of gas tungsten arc welding.

Objectives	Measures
9.11 Make a flat butt weld using 14-gauge aluminum.	
9.12 Make a lap fillet weld in the flat position using 14-gauge aluminum.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Welding

COMPETENCY GOAL 10: The learner will describe the principles of gas metal arc welding.

Objectives	Measures
10.1 Identify and describe the function of the different parts of the G. M. A. W. process.	Refer to competency Test Item Bank VEC-T&I-C/TB 7871, 7872, 7873.
10.2 Set up and shut down the G. M. A. W. process.	
10.3 Make a butt weld in the horizontal and vertical positions.	
10.4 Make fillet welds (lap and V-joints) using the carbon dioxide welding method.	
10.5 Make fillet welds (lap and V-joints) using the spray arc welding variation.	
10.6 Make beads using flux-cored wire with and without gas.	

VOCATIONAL EDUCATION
TRADE AND INDUSTRIAL EDUCATION

Grade Level: 10-12 Skills/Subject Area: Welding

COMPETENCY GOAL 11: The learner will prepare and tack pipe workpiece.

Objectives	Measures
11.1 Weld pipe in fixed positions.	Refer to competency Test Item Bank VEC-T&I-C/TB 7871, 7872, 7873.
11.2 List the procedures for preparing a tack pipe workpiece.	

APPENDICES

APPENDIX A

House Bill 1567*

A BILL TO BE ENTITLED AN ACT TO ENACT THE ELEMENTARY AND SECONDARY SCHOOL REFORM ACT OF 1984.

The General Assembly of North Carolina enacts:

Section 1. This act may be referred to as the "Elementary and Secondary School Reform Act of 1984."

Section 2. G.S. 115C-81(a) is amended by deleting the first paragraph and substituting the following:

"Standard Course of Study. It is the policy of the State of North Carolina to insure a quality education to every child residing in North Carolina. To this end, the General Assembly directs the State Board of Education to develop a standard course of study to be offered to every child in North Carolina public schools and to submit the proposed standard course of study to the General Assembly by October 15, 1984.

The standard course of study shall reflect a rigorous academic course of study stressing mastery of integrated knowledge based on mastery of competencies in the basic skill areas rather than the study of isolated disciplines. To this end, the State Board of Education is directed to undertake a statewide audit of current curricula and to refine the curricula as required to comply with this policy. The standard course of study:

1. shall stress mastery of integrated knowledge;

2. should provide students with the specific competencies needed to gain employment or to continue their education;

3. should provide students with the skills necessary to cope with contemporary society;

4. shall contain a vocational education component designed to meet the State's and local anticipated career training needs;

5. shall provide for a program of continuous learning based upon the individual child's need, interest, and stages of development, so that the program has a nongraded structure of organization;

6. shall set forth what subjects shall be taught in each grade, and outline the basal and supplementary books on each subject to be used in each grade;

7. shall include a core curriculum for all students plus additional elective curriculum choices to meet the varied needs and interests of students;

8. shall establish a minimum length of the instructional day;

9. shall prescribe standards for student performance and promotion and may consider appropriate levels at which remediation should begin; and

10. shall describe appropriate class size for each course required by the standard course of study; staffing levels to support the standard course of study, and may include minimum staffing for schools, regardless of size, where such schools are determined to be essential to serve pupils located in isolated geographic areas; minimum facility requirements for the standard course of study; minimum material requirements for the standard course of study; and such other information the Board finds necessary to enable the General Assembly to allocate appropriate resources to implement the plan."

*Includes only that portion of HB 1567 addressed by the Basic Education Program for North Carolina's Public Schools, the North Carolina Standard Course of Study, and the North Carolina Competency-Based Curriculum.

APPENDIX B

16 NCAC 2E.0103; STANDARD COURSE OF STUDY: POLICIES

(a) Definitions. As used in this Rule:

- (1) "Standard Course of Study" means the program of course work for each of the various subjects taught in the elementary and secondary schools of the state, together with competency goals and performance indicators, as defined in (4) and (5) of this subsection, which have been adopted by the state board pursuant to G. S. 115C-81 (a) and subsection (b) of this Rule.
- (2) "Curriculum guide" means a document prepared by the State Department of Public Instruction for each subject or area of study listed in the Standard Course of Study, including suggestions as to suitable instructional aids, textbooks and supplementary resources, learning experiences and teaching methods.
- (3) "Course unit" means a minimum of 150 clock hours of instruction. Short courses will be credited in an amount corresponding to the fractional part of a total unit.
- (4) "Competency goals" means the ends toward which student learning is directed.
- (5) "Performance indicators" means quantitative measures of progress toward competency goals.

(b) The state board shall adopt and periodically review the Standard Course of Study, upon recommendation of the State Superintendent and pursuant to a public hearing and any changes the board deems appropriate. The Standard Course of Study shall be published by the state board. Copies of the Standard Course of Study and the curriculum guides may be obtained from the Department of Public Instruction, 116 W. Edenton Street, Raleigh, N. C. 27611.

(c) The Standard Course of Study shall include, at a minimum, a kindergarten through 12th grade program of studies in the following areas:

- (1) citizenship, including the social studies-economics, history, government, sociology and human relations;
- (2) communications, including foreign languages, educational media, and all phases and applications of English-language arts;
- (3) cultural arts, including the fine and performing arts, recreation and avocations, addressed to both performance and consumer objectives;
- (4) healthful living, including personal and community health, physical education, recreation, and safety;
- (5) mathematics, including computational, problem solving, and consumer skills and substantive advanced elective sequences;
- (6) science, including the basic study of all living and nonliving things as well as advanced elective sequences; and

(7) vocational, including a developmental design, moving from occupational exploration in the middle grades, to selective specialization in the senior high school, as set out in the state Master Plan for vocational education.

(d) The development of subject and course content in the study areas listed in (c) of this Rule shall include, as appropriate for the various grade levels, the study of Americanism, the government of the State of North Carolina, the government of the United States, fire prevention, harmful or illegal drugs including tobacco and alcohol, and the free enterprise system.

(e) The Standard Course of Study shall be implemented in the kindergarten through eighth grades through an appropriate developmental program in each study area for individual pupils. Summer school for these grades is considered an integral part of the regular school term. The Standard Course of Study shall be implemented in the 9th through 12th grades through a program of representative course offerings in each study area.

(f) Graduation Requirements

(1) In addition to the requirements of 16 NCAC 2G.0702, students graduating during or after the 1986-87 school year must successfully complete 20 courses units in grades 9 through 12 to be graduated from high school. These course units must include the following:

(A) four course units in English;

(B) two course units in mathematics;

(C) two course units in social studies; one unit in government and economics, and one unit in United States history;

(D) two course units in science, one unit in a life science or biology, and one unit in one of the physical sciences;

(E) one course unit in physical education and health;

(F) nine course units to be determined by the local education agency. These may be undesignated electives or designated from the study areas described in subsection (c) of this Rule.

(2) Course work successfully completed in the ninth grade at a school system where course units are not awarded in the ninth grade shall be deemed to satisfy the requirements of (1) of this subsection.

(3) Course work successfully completed by students in grades 9 through 12 at a summer school session may be used to satisfy the requirements of (1) of this subsection. Course units so taken shall be earned in the same manner as otherwise provided in this Rule, except that for students repeating courses in summer school the principal shall determine the hours of instruction required to be repeated.

(4) Course work successfully completed by students in grades 9 through 12 at an off-campus institution may be used to satisfy the requirements of (1) of this subsection. No high school may approve enrollment in post-secondary institutions during the regular school year in excess of five percent of its enrollment in grades 10-12 except as approved by the State Board of Education. Enrollment under this policy in community college institutions shall be in accordance with 16 NCAC 2E.0301.

History Note: Statutory Authority G. S. 115C-12(9)c; G. S. 115C-81(a);
Eff. February 1, 1976
Readopted Eff. February 3, 1978;
Amended Eff. April 1, 1983; June 8, 1979

APPENDIX C

COURSE REQUIREMENTS FOR HIGH SCHOOL GRADUATION

Course Units	Subjects
4	English
2	Mathematics
2	Social studies (1 unit in government and economics, 1 unit in United States History)
2	Science (1 unit in a life science or biology, 1 unit in one of the physical sciences)
1	Physical education and health
9	Determined by the local education agency (these may be undesignated electives or designated in the study areas of citizenship, communications, the arts, healthful living, mathematics, science, vocational education)

20 Total Course Units

APPENDIX D

NORTH CAROLINA STATE BOARD OF EDUCATION
NORTH CAROLINA SCHOLARS' PROGRAM

PLAN A

The North Carolina State Board of Education, believing that the success of our State and Nation depends on the full development of our youth and that some students should be encouraged to pursue a well-balanced but more vigorous high school program, institutes a North Carolina Scholars' Program.

Beginning with the 1983-84 school year, students satisfactorily completing requirements as identified by the State Board shall be named North Carolina Scholars and receive special recognition by the State Board.

Course Requirements

Program Area	Units
English	4
Mathematics - Algebra I, Geometry, Algebra II, one beyond Algebra II	4
Science - Biology, Chemistry, Physics (or in lieu of Physics, one other advanced science)	3
Social Studies - U. S. History, Government/Economics, World Cultures (Prior to 1987, U. S. History plus two elective units)	3
Foreign Languages - two levels of the same language	2
Health, P. E.	1
Vocational Education	1
Arts Education	1
Electives - minimum of three	3
	22

Additional Requirement

Students must have an overall four year grade average of B or its equivalent as determined by the local board of education. Equivalency may be determined by numerical grades or weighted grade point averages.

Recognition

1. Students meeting all requirements for a North Carolina Scholars' Program receive from the State Board of Education an appropriate seal of recognition to be affixed to the diploma.

2. Special recognition events should be held in the school and community to honor the students and their parents. These should include appropriate, special recognition at graduation exercises.

3. The State of North Carolina as well as business and industry should consider awarding other special recognitions to these students.

4. Colleges and universities should consider the North Carolina Scholars' achievement when making decisions concerning acceptance by their institutions.

5. An identification of potential candidates for this achievement should be made at the end of grade 11. Candidates would include those students who, after completing their selected senior courses with the designated grade average, would be eligible for recognition. This identification of candidates would reinforce the students' efforts to achieve the recognition and could also be included on their application forms and/or transcripts to colleges and universities.

NORTH CAROLINA STATE BOARD OF EDUCATION
NORTH CAROLINA SCHOLARS' PROGRAM

PLAN B

The North Carolina State Board of Education, believing that the success of our State and Nation depends on the full development of our youth and that some students should be encouraged the pursue a well-balanced but more vigorous high school program, institutes a North Carolina Scholars' Program with concentration in one or more program areas. In order to allow more flexibility in the program, consideration should be given to the optional sequence of courses listed below as an alternative to Plan A.

Beginning with the 1983-84 school year, students satisfactorily completing requirements as identified by the State Board shall be named North Carolina Scholars and receive special recognition by the State Board.

Course Requirements

Program Area	Units
English	4
Mathematics - Algebra I, Geometry, Algebra II	3
Science - Biology, Chemistry, Physics (or in lieu of Physics, one other advanced science)	3
Social Studies - U. S. History, Government/Economics, one additional social studies (Prior to 1987, U. S. History plus two elective units)	3
Foreign Languages - two levels of the same language	2
Health, P. E.	1
Vocational Education	1
Arts Education	1
Electives - minimum of four (concentrations may be selected as listed below)	4
	22

Concentrations

Mathematics - at least one additional advanced unit (balance - 3 electives)

Science - at least one additional advanced unit (balance - 3 electives)

Social Studies - at least one additional unit (balance - 3 electives)

Foreign Languages - at least two additional units of the same language (balance - 2 electives)

Health, P. E. - at least three additional units (balance - 1 elective)

Arts Education - as least three additional units (balance - 1 elective)

Vocational Education - at least three additional units (balance - 1 elective) Three of the minimum four units required for concentration in vocational education must be related to the same vocational objective. Additional units may be related to the same vocational objective or may be in other vocational areas.

Additional Requirement

Students must have an overall four year grade average of B or its equivalent as determined by the local board of education. Equivalency may be determined by numerical grades or weighted grade point averages.

Recognition

1. Students meeting all requirements for a North Carolina Scholars' Program will receive from the State Board of Education an appropriate seal of recognition to be affixed to the diploma.
2. Special recognition events should be held in the school and community to honor the students and their parents. These should include appropriate, special recognition at graduation exercises.
3. The State of North Carolina as well as business and industry should consider awarding other special recognitions to these students.
4. Colleges and universities should consider the North Carolina Scholars' achievement when making decisions concerning acceptance by their institutions.
5. An identification of potential candidates for this achievement should be made at the end of grade 11. Candidates would include those students who, after completing their selected senior courses with the designated grade average, would be eligible for recognition. This identification of candidates would reinforce the students' efforts to achieve the recognition and could also be included on their application forms and/or transcripts to colleges and universities.

APPENDIX E

NORTH CAROLINA COMPETENCY-BASED CURRICULUM

Sample Page

Grade Level: 6 Skills/Subject Area: Social Studies/Knowledge

Competency Goal: 1. The learner will know that ways of living change over time and how and why these changes occur (history).

OBJECTIVES	MEASURES
1.1 Identify changes which have occurred in Europe and/or the Soviet Union.	1.1.1 List changes which have occurred when given an appropriate series of photographs depicting changes in ways of living (dress, housing, work, transportation, and entertainment) in Europe and/or the Soviet Union.
	1.1.2 Draw a picture depicting what s/he believes to be the most significant change to have taken place in Europe or the Soviet Union; describe the picture and explain her/his reasoning aloud to the rest of the class.
1.2 Identify the effect of important changes which have occurred in Europe or the Soviet Union.	1.2.1 Place the examples in chronological order when given appropriately chosen examples of change in Europe or the Soviet Union.
	1.2.2 Match the changes to the resulting effects and identify the country in which each change/effect occurred when given a list of changes and a list of effects.

APPENDIX F

TESTING REQUIREMENTS

Annual Testing Program

The Annual Testing Program consists of standardized tests in reading, language arts, and mathematics administered at grades 1, 2, 3, 6, and 9.* Beginning with science and social studies tests, other skills and subject areas may be added to this program in the future.

Promotion Testing

Phase 1: A student in grades 3, 6, or 8 who scores at or above the 25th percentile (total battery) in the Annual Testing Program meets the State standard for promotion and must them meet local requirements. A student who scores at the 24th percentile or below enters phase two.**

Phase 2: In phase two, a student is tested for mastery of competencies on a test developed by the State Board of Education. Students who demonstrate mastery meet State requirements and then must meet local requirements. Students who do not demonstrate mastery must be retained or attend a State-supported summer remediation program. Students attending the summer program will be assessed to determine whether they have mastered the minimum standards. Those who demonstrate mastery will have met State standards and may be promoted if they have also met local requirements. Those who have not demonstrated mastery will be retained.

End of Course Testing

End of Course Testing is conducted at the secondary level in Algebra I and biology. It is anticipated that up to 20 other courses may be added to this program by the year 1990.

Minimum Competency Testing

Students in grade 11*** are tested for mastery of minimum competencies in the areas of reading and mathematics. In order to graduate from high school, students must receive a passing score on all areas of the Minimum Competency Test.

* It is anticipated that testing will be moved from grade 9 to grade 8.

** The State standard will not apply to students already retained in the same grade span or certified as trainable mentally handicapped, educable mentally handicapped, or severely/profoundly mentally handicapped. Students otherwise handicapped may also be exempted according to standards and procedures developed by the State Board of Education.

*** It is anticipated that testing will be moved from grade 11 to grade 10.

APPENDIX G

TEXTBOOK ADOPTION PROCESS IN NORTH CAROLINA*

The first step in the adoption of basic textbooks is the appointment of a Textbook Commission as set forth in G.S. 115C-87. The law provides that the Textbook Commission shall be composed of fourteen members to be appointed by the Governor upon the recommendation of the State Superintendent of Public Instruction. The law further prescribes that seven of the members shall be outstanding teachers or principals in the elementary school grades, that five shall be outstanding teachers or principals in the high school grades, and that two shall be lay members, one of which shall be the parent of an elementary school student, and one of which shall be the parent of a high school student, with the added proviso that one of the members may be a county or city superintendent.

The State Board of Education authorizes textbook adoptions as set forth in G.S. 115C-85 and 86. The State Superintendent notifies members of the Textbook Commission that there is to be an adoption in a given subject area or areas. The State Superintendent also notifies all registered textbook publishers of the adoption call and invites them to submit any materials they would like to have considered.

Members of the Textbook Commission evaluate all textbooks offered for adoption.

All books submitted are viewed and evaluated within a frame of reference determined by the State course of study. Pursuant to a call and prior to reviewing materials, members of the Textbook Commission and the professional staff of the Department of Public Instruction engage in a thorough overview of the program of studies and develop a concise statement of philosophy, goals, and objectives for the course or subject area under consideration. This statement also reflects any changes or innovations in the program and takes into account current trends and emphases stemming from sound, authoritative research, and experimentation.

In the review and evaluation process each Commission member secures the help of as many advisers as he or she may choose. The number will vary but the usual practice has been for each member to select eight to twelve such advisers. Special expertise in the subject area under consideration is the main criterion in choosing advisers. Each Commission member tries to secure a representative group including classroom teachers, college personnel, supervisory and administrative personnel, and possibly laymen and students.

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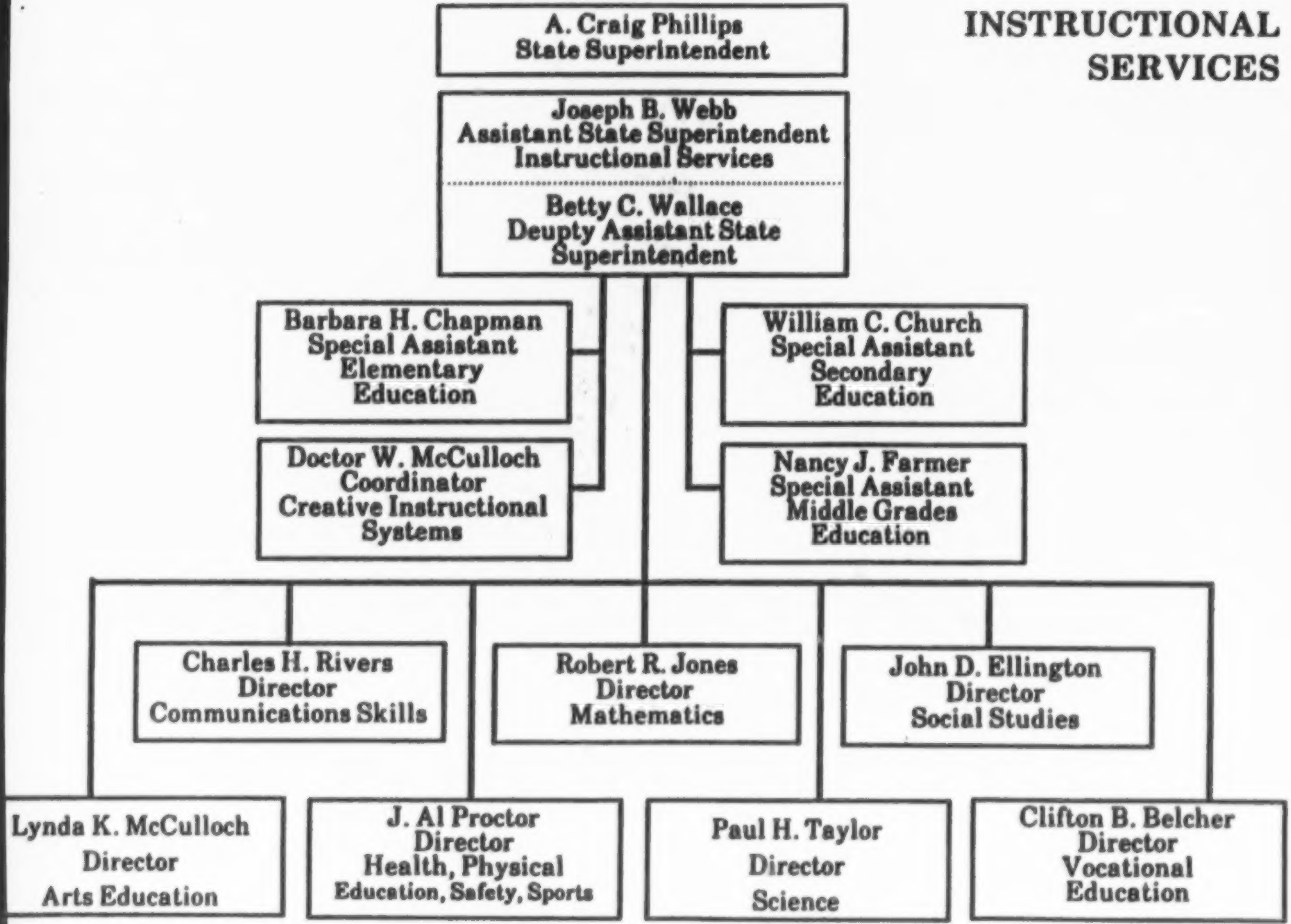
*From North Carolina State Adopted Basic Textbooks 1984-85. Raleigh, NC: Division of Textbooks, Controller's Office, Department of Public Education, 1984.

When the review process is completed, each Commission member files a written evaluation of every book submitted. These evaluation reports must be signed by the member making the report and the Commission Chairman delivers them to the State Superintendent who is also Secretary to the State Board of Education. At the next meeting of the Board of Education, after evaluation reports are filed, the members of the Textbook Commission meet with the Board for joint review and consideration of the reports. In the evaluation of basic textbooks the members of the Commission do not concern themselves in any way with the price of the book or its physical features.

Following the joint session of the Textbook Commission and the State Board to consider the findings and recommendations of the Commission, the State Board officially calls for sealed bids on those books which the Textbook Commission found to be most appropriate for implementing the desired program of instruction in North Carolina schools. Bids are customarily received on five to eight books. At the next meeting or at another designated regular meeting of the Board, the bids are opened and contracts awarded. Where significant differences in the appropriateness of books were noted by the Textbook Commission, the State Board traditionally has placed priority on securing the best materials available.

INSTRUCTIONAL SERVICES


A. Craig Phillips
State Superintendent
Joseph B. Webb
Assistant State Superintendent
Instructional Services
Betty C. Wallace
Deupty Assistant State Superintendent
Barbara H. Chapman
Special Assistant
Elementary Education
Doctor W. McCulloch
Coordinator
Creative Instructional Systems
William C. Church
Special Assistant
Secondary Education
Nancy J. Farmer
Special Assistant
Middle Grades Education
Charles H. Rivers
Director
Communications Skills
Robert R. Jones
Director
Mathematics
John D. Ellington
Director
Social Studies
Lynda K. McCulloch
Director
Arts Education
J. Al Proctor
Director
Health, Physical Education, Safety, Sports
Paul H. Taylor
Director
Science
Clifton B. Belcher
Director
Vocational Education

APPENDIX I

Suggestions for Additions to or Revisions of the

North Carolina Competency-Based Curriculum

1. Suggestion for: A. addition ☐ B. revision ☐ (please check one)

2. Skills/Subject Area: ____________________
(e.g., Mathematics, Social Studies, Science)

3. Page Number: ______

4. Addition/Revision to: (please check & give number)

Introduction ☐
Competency Goal ☐ Number: ______
Objective ☐ Number: ______
Measure ☐ Number: ______

5. SUGGESTION: ____________________

6. Name of person submitting suggestion: ____________________
Place of employment: ____________________
Employed as: ____________________
Address: ____________________

Please return this form to: Joseph B. Webb
Assistant State Superintendent
for Instructional Services
Education Building, Raleigh, NC 27611